

*Binder Copy*  
**April, 1947**  
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# MODERN Machine Shop

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DETROIT



**USE THIS  
CYLINDRICAL  
ROLLER  
BEARING**

For HIGH SPEEDS  
HEAVY LOADS  
TEMPORARY  
OVERLOADS  
SHOCK AND  
VIBRATION

Features: Full line contact of rolling surfaces and large radial load capacity for continuous and intermittent service. Temporary overload capacity 50% above normal catalog rating. Available in five standard types in both inch and metric dimensions.

**NORMA-HOFFMANN**  
PRECISION BALL, ROLLER AND THRUST BEARINGS

NORMA-HOFFMANN BEARINGS CORPORATION  
STAMFORD, CONN., Field Offices: New York, Chicago,  
Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles,  
San Francisco, Seattle, Phoenix



Illustration of die milling by courtesy of the Bischof Die and Engraving Company of Racine, Wis.

## BUT... **GORTON** Tracer Controlled Milling DID THE JOB

A Gorton Super-Speed Tracer-Controlled Milling Machine with adjustable ram together with a super-speed spindle made it possible to mill to a depth of  $\frac{1}{2}$ " with a  $\frac{1}{16}$ " dia. cutter (producing thin wall in finished die casting; see arrow). This was for the main frame for a vibrating hand massager manufactured by the John Oster Manufacturing Company of Racine, Wis. Only one Master model was used to mill a two-cavity die casting die with a minimum of hand finishing—this is typical of Gorton Tracer-Controlled equipment.

If you are interested in die and mold work, production profiling, super-speed milling, engraving, graduating, contour grinding or electric etching of hardened parts, let...

### GORTON PRE-DETERMINE RESULTS FOR YOU

Mail us complete description with prints of your job. Gorton engineers will furnish you with a production estimate of it tooled on a Gorton—no obligation.

### THE JOB IN BRIEF

- Job: Mill 2-cavity die casting die from single soft master.
- Material: Hot formed die steel.
- Machine: Gorton 8 $\frac{1}{2}$ -D Super-Speed Dupli-cator.
- Method: Two machine settings per cavity without resetting work.
- Cutters: Gorton single flute; minimum dia.,  $\frac{1}{16}$ "; maximum depth of cut,  $\frac{1}{4}$ ".
- Spindle Speeds: Roughing, 250 r.p.m.; finishing, 6000 r.p.m.
- Limits: .002" with minimum hand finishing.

### PLEASE SEND WITHOUT OBLIGATION

Bulletin No. 1655-1704

Name.....  
Company.....  
Position.....  
Address.....  
City..... Zone..... State.....

Send for Bulletin 1655 on Tracer Control—use handy coupon at right—today!



**GEORGE GORTON MACHINE CO.**

*Tracer Controlled Milling*

1704 RACINE STREET • RACINE, WISCONSIN, U. S. A.

When you need our help  
In a hurry—DON'T  
WRITE, PHONE Jackson  
417.



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April,



## Another New Machine Tool Relies On **TIMKEN BEARINGS**

The GARVIN "Hi-Power" Automatic Tapper pictured here, with a capacity up to 3" diam. taps in cast iron, is the latest addition to the list of Timken Bearing Equipped machine tools, manufactured by the Western Machine Tool Works, Holland, Michigan.

Timken Tapered Roller Bearings are mounted on all transmission shafts besides the heavy duty splined spindle, for, like all precision machine tools, this automatic tapper requires accurate, dependable operation under very heavy loads and high speeds. Timken Bearings give the assurance of smooth, efficient performance, with reduced operating and maintenance costs.

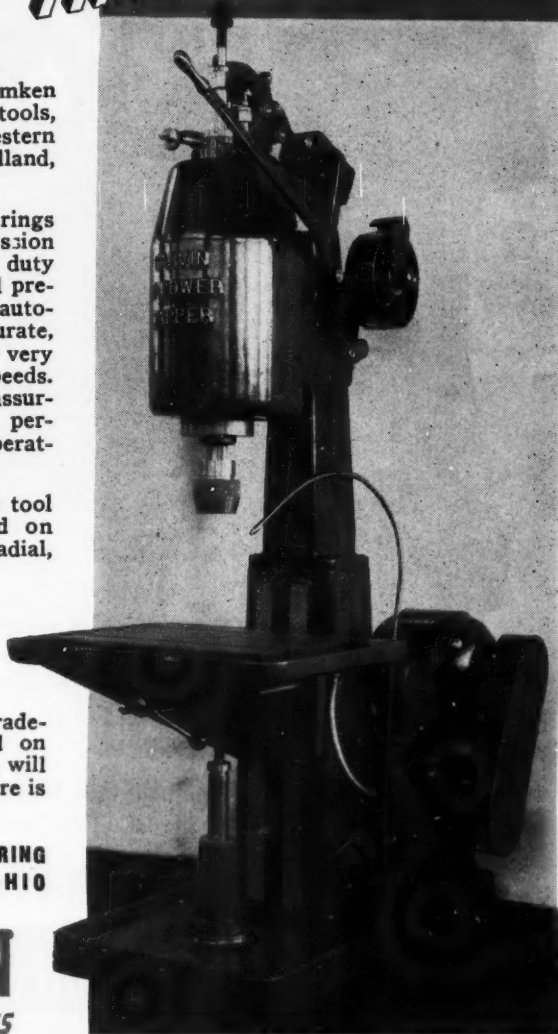
For years leading machine tool manufacturers have relied on Timken Bearings to carry radial, thrust and combined loads; to hold moving parts in constant alignment; eliminate friction and wear; simplify lubrication.

By always looking for the trademark "TIMKEN" stamped on bearing cups and cones, you will be assured of getting all there is in bearings.

THE TIMKEN ROLLER BEARING  
COMPANY, CANTON 6, OHIO

# TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.  
TAPERED ROLLER BEARINGS



# THE LANDMACO THREADING MACHINE ASSURES MINIMUM OPERATING COSTS



The Landmaco Threading Machine is a precision tool capable of handling your threading operations economically. It is geared for high threading speeds with resultant maximum production.

Its many exclusive features assure the greatest possible degree of accuracy, ease of operation and flexibility in making set-up changes.

**Write for Bulletin No. H-75**

**LANDIS MACHINE COMPANY, WAYNESBORO, PENNA., U.S.A.**

**THREAD CUTTING MACHINES • DIE HEADS • COLLAPSIBLE TAPS • THREAD GRINDERS**

This Assembly Undergoes

**19**

**FINISHING OPERATIONS**

at once!



**Its mating parts fit together perfectly after one complete Bore-Matic cycle**

HERE'S HOW a vacuum cleaner manufacturer achieves the balanced production of assembly units needed to speed his output and cut operating costs. He uses a single Heald No. 49 Double End Bore-Matic to finish mating parts at 3 separate stations, in one automatic cycle. Altogether, this machine performs 19 various finishing operations, including boring, plunge facing, chamfering and turning—each to extremely close tolerances.

Intricate tooling setups like this one, worked out by experienced Heald engineers, can mean valuable indirect savings as well as greater production in your own work. For they produce uniformly accurate results which reduce scrap to a minimum, assure a fine finish, and speed

final assembly. All finished parts match perfectly, providing a balanced output of parts and eliminating the need for costly hand fitting and selective assembly.

If you manufacture mating parts, or any other high precision product, let Heald engineers show you where the most accurate production methods are often the fastest and most economical. Get in touch with the Heald branch office nearest you, or write: THE HEALD MACHINE COMPANY, Worcester 6, Mass.

**HEALD**

means more precision  
... less cost

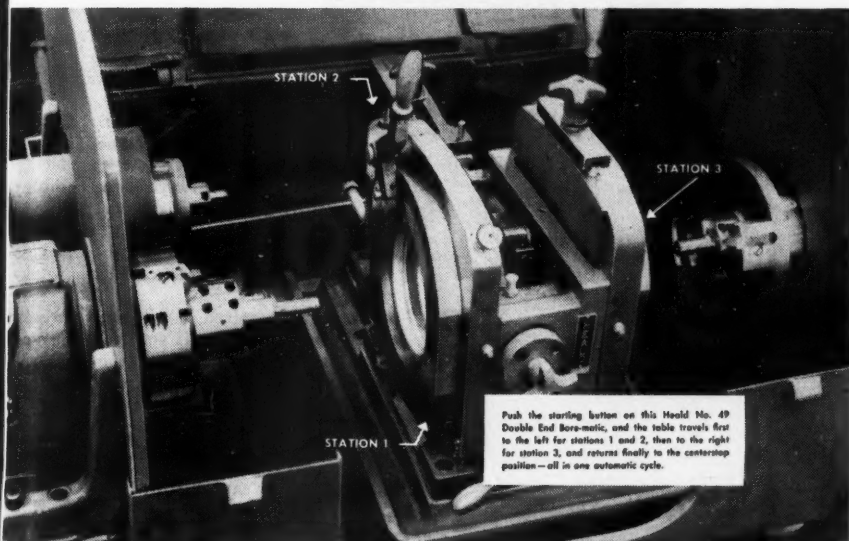
Branch Offices in Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York



STATIONS 1 and 2



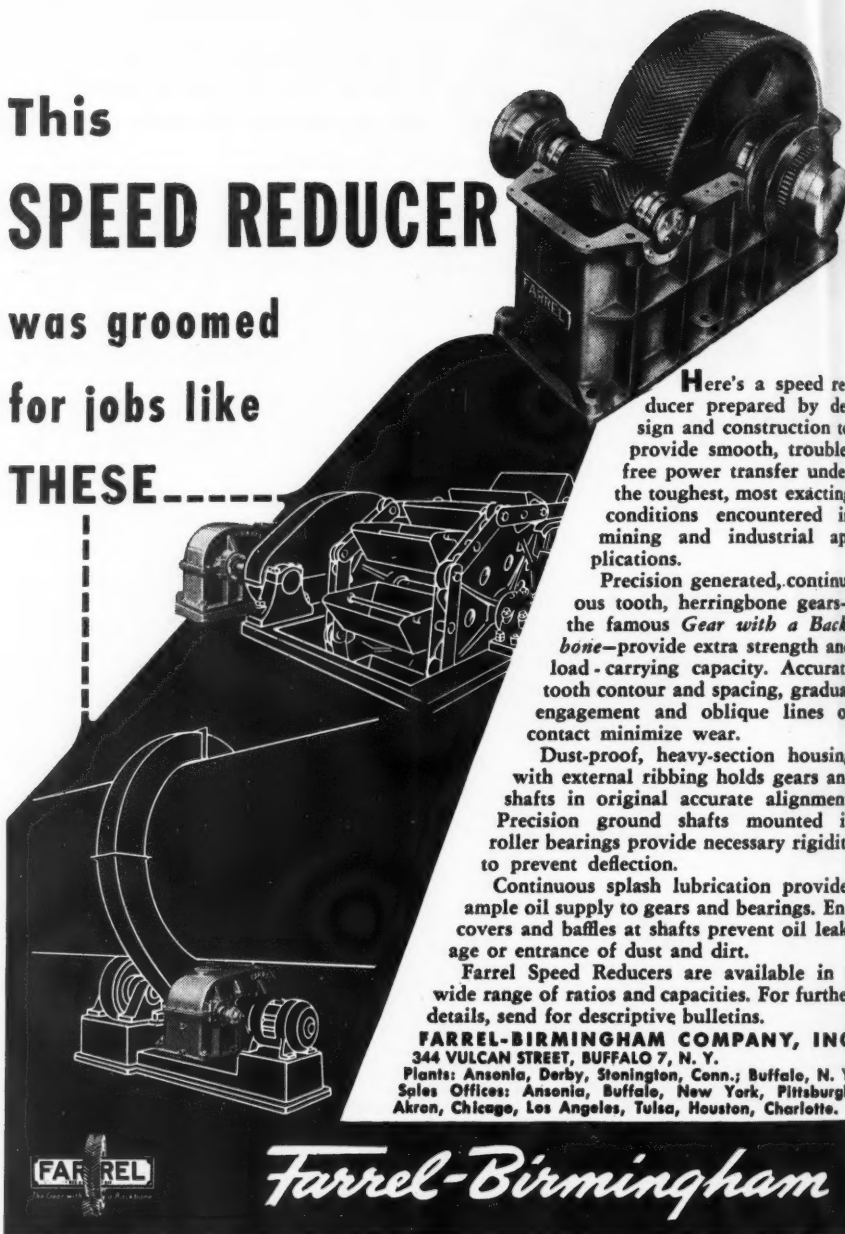
STATION 3



INTERNAL AND SURFACE GRINDING MACHINES BORE-MATIC PRECISION FINISHING MACHINES

# This SPEED REDUCER

was groomed  
for jobs like  
THESE-----



Here's a speed reducer prepared by design and construction to provide smooth, trouble-free power transfer under the toughest, most exacting conditions encountered in mining and industrial applications.

Precision generated, continuous tooth, herringbone gears—the famous *Gear with a Backbone*—provide extra strength and load-carrying capacity. Accurate tooth contour and spacing, gradual engagement and oblique lines of contact minimize wear.

Dust-proof, heavy-section housing with external ribbing holds gears and shafts in original accurate alignment. Precision ground shafts mounted in roller bearings provide necessary rigidity to prevent deflection.

Continuous splash lubrication provides ample oil supply to gears and bearings. End covers and baffles at shafts prevent oil leakage or entrance of dust and dirt.

Farrel Speed Reducers are available in a wide range of ratios and capacities. For further details, send for descriptive bulletins.

**FARREL-BIRMINGHAM COMPANY, INC.**  
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Plants: Ansonia, Derby, Stonington, Conn.; Buffalo, N. Y.  
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston, Charlotte.



## Farrel-Birmingham

VOLUME 19

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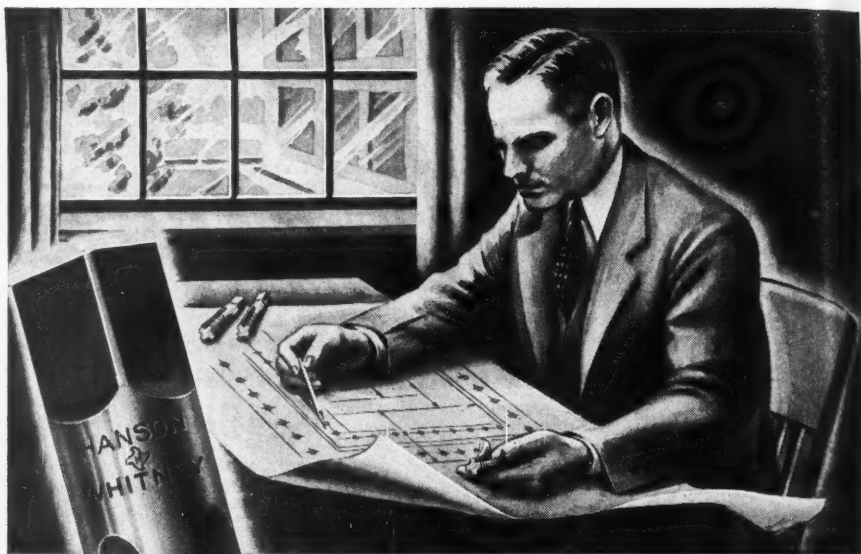
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## *Count the Cost* **per TAPPED HOLE**

The cost of a tap is determined by its capacity to produce smooth, accurate threads with a minimum number of rejects . . . not by its initial cost. You are assured greater dependability, longer runs between grinds, speeded-up thread production by the use of Hanson-Whitney taps. Let Hanson-Whitney engineers help you lower the cost per tapped hole by applying the proper tap for a specific job. For further information, write:

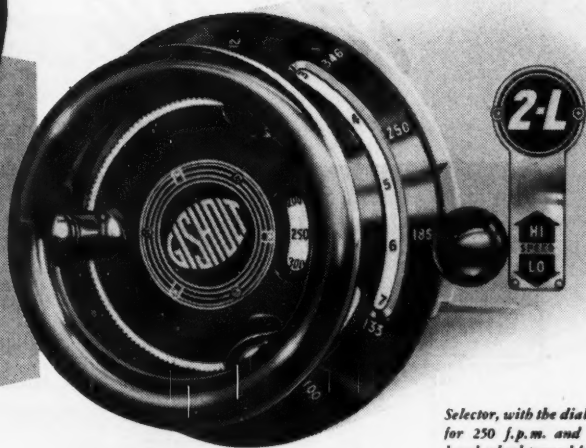
Hanson Whitney Machine Company, Hartford, Conn.



# *Hanson Whitney*

M A C H I N E C O M P A N Y  
H A R T F O R D • C O N N E C T I C U T

# HYDRAULIC SPEED SELECTOR



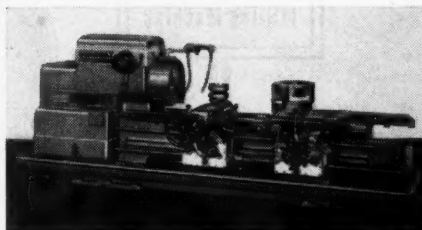
Selector, with the dial set for 250 f.p.m. and the hand wheel turned for a cut of 3/4-inch diameter.

## Now *Standard Equipment* on Gisholt Turret Lathes!

With a Gisholt you can obtain any one of 12 spindle speeds, instantly, without releasing the main drive clutch—without even stopping the spindle!

With the Hydraulic Speed Selector, you don't waste time and effort between cuts. Merely set the dial for the cutting speed you wish, then turn the hand wheel for the proper diameter. You pre-select the speed and diameter for the next cut while this one is being made. And when it's time to change—just tap the trip lever!

Easy? Of course. But more than that, the Gisholt Hydraulic Speed Selector is a big step toward maximum production at rock bottom cost.



**GISHOLT 2L HIGH PRODUCTION SADDLE TYPE TURRET LATHE**—Product of a half century devoted to the finest class of metal-working equipment, the Gisholt 2L is designed for the maximum speeds and feeds cutting tools will withstand. Incorporated in its rugged design are a number of simple, power operated controls designed to cut time and effort to a minimum. Write for full details.

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THE GISHOLT ROUND TABLE represents the collective experience of leading specialists in the machining, surface-finishing, and balancing of round and semi-round parts. Bring your problems here.



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**A NEW ADDITION TO THE CINCINNATI LINE  
OF GENERAL PURPOSE MILLING MACHINES**

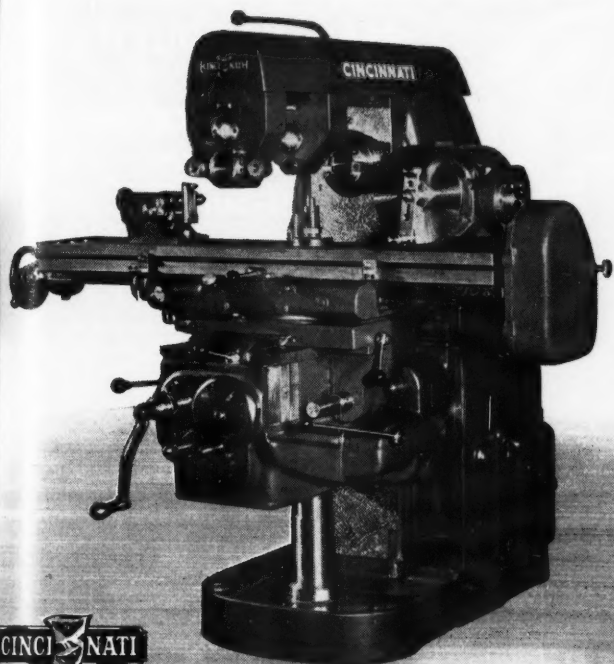
**CINCINNATI  
No. 2 ML Plain  
Milling Machine**



**THE CINCINNATI MILLING MACHINE CO.**

**CINCINNATI 9, OHIO, U. S. A.**

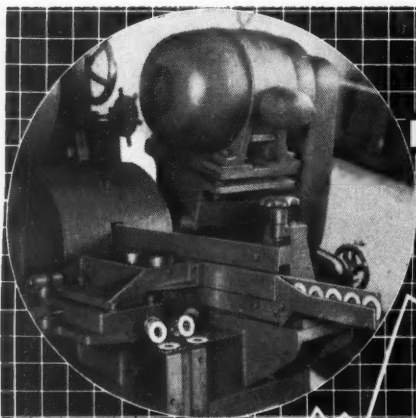
**MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES**



**CINCINNATI**  
No. 2 ML Universal  
Milling Machine

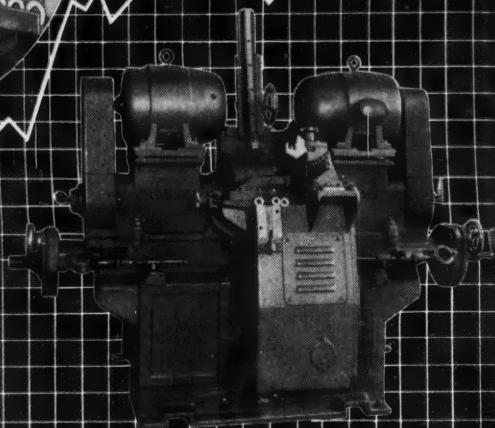
● Here's a new milling machine—the CINCINNATI No. 2 ML—that's just right for your milling operations within 3 h.p. cutting capacity on a variety of work. ¶ It's a companion machine to the popular No. 2 MI.

Quite naturally, it has all the features of the No. 2 MI, and offers all the advantages so important to economical shop practice. Through wide speed and feed ranges, it offers top cutting efficiency when using small two-tip end mills or fairly large face mills. You'll appreciate the  $\frac{1}{4}$ " feed rate for mill-saw operations on high speed steel; or the 30" feed rate when routing out an aluminum pattern. There are many other cost-reducing features, too. And operators like the 2 ML because it's safe, it's easy to operate, it requires a minimum of daily service attention. ¶ May we send complete information to you? The 2 ML's are built in Plain and Universal styles. Write for catalog M-1507-1.



**PEAK PRODUCTION**  
and  
**PRECISION ACCURACIES**  
on this  
*Parallel-Surface Job*

with a  
**GARDNER**  
*Double*  
**GRINDER**



**T**HESE DAYS, the attainment of peak production levels, without lowering inspection standards, necessitates the "mechanization" of processing operations.

In the electrical equipment field, a No. 115-15" GARDNER Double GRINDER, equipped with a feed-through type fixture, accurately grinds TWO faces of special composition washers, at ONE setting. The washers are fed through the machine on thin steel guide bars in a continuous stream. These excep-

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WIRE-LOKT  
Abrasives  
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► **PEAK PRODUCTION:** 40 to 60 per minute, depending on size.

► **PRECISION ACCURACIES:** .0005" for parallelism; .004" to .006" for uniformity.

If you encounter parallel-surface grinding jobs, our engineers will show you how modern GARDNER Double GRINDERS will improve your accuracies and increase your production.

Write for Data on GARDNER Double GRINDING!

GARDNER - GRIND  
YOUR *Flat* SURFACES

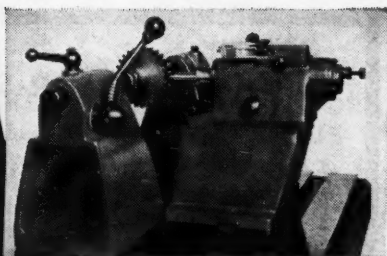
**GARDNER MACHINE COMPANY**

428 East Gardner Street • • • • • Beloit, Wisconsin, U.S.A.

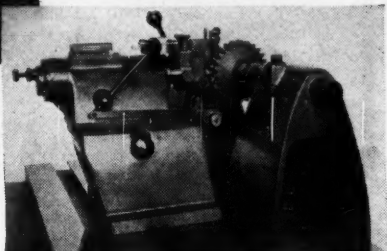


# *Simplified* GEAR INSPECTION for Concentricity, Tooth Spacing and Taper

★ Versatile, compact, and profitable to own, the Fellows 12C and 12CT Bench-Type Inspection Instrument is ideal for the gear shop that cannot afford expensive gear checking equipment.



*Instrument set-up for checking concentricity.*



*Instrument adapted for inspection of tooth spacing and taper.*

This cone, tooth spacing, and taper inspection instrument can be quickly changed from one test to another, all checks being made with interchangeable measuring heads. Both the cone-point device for checking concentricity, and the tooth spacing device are fitted with dial indicators and automatic indexing. Capacities up to 12" P.D. on mountings to 15" long. Your gear shop can have an accurate check at all stages of production — reducing rejects and assuring your customers of accurate gears.

# *Fellows*

THE FELLOWS GEAR SHAPER CO., HEAD OFFICE AND EXPORT DEPT., SPRINGFIELD, VERMONT.  
BRANCH OFFICES: 616 FISHER BLDG., DETROIT 2...OR 640 W. TOWN OFFICE BLDG., CHICAGO 12.

# MORRIS MOR-SPEED RADIAL DRILL

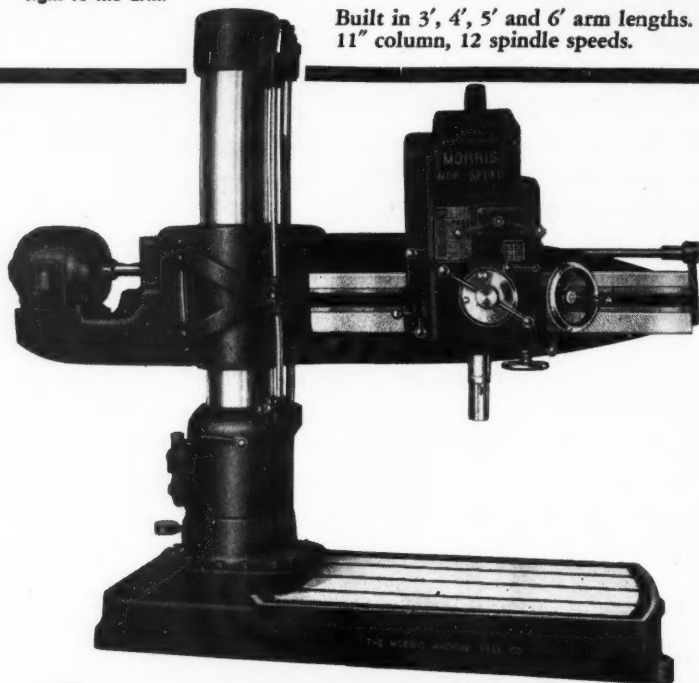
FOR

## FAST, ECONOMICAL, DEPENDABLE PERFORMANCE

Morris Mor-Speed radials meet the demand for a high grade machine for fast, economical drilling, boring, reaming, facing and tapping. To insure Mor-Speed, the following features are incorporated:

- Centralized Control—All speeds and feed changes are located in the head. All changes are made instantly without operator leaving his working position.
- Index Plates are direct reading. They are placed directly at speed and feed changes.
- Dial Depth Gauge is graduated and has a direct reading plate for setting drills to compensate for drill points.
- The Head Clamp is located on the side of the head and clamps the head absolutely tight to the arm.

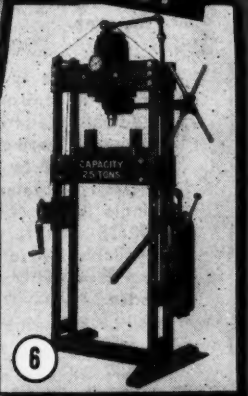
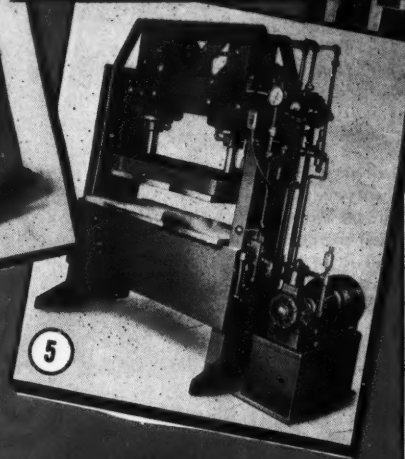
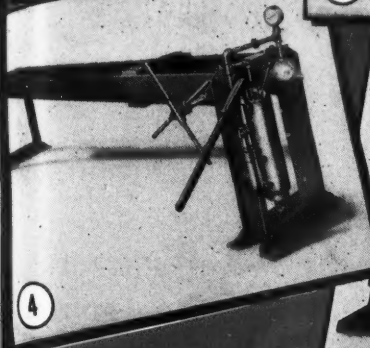
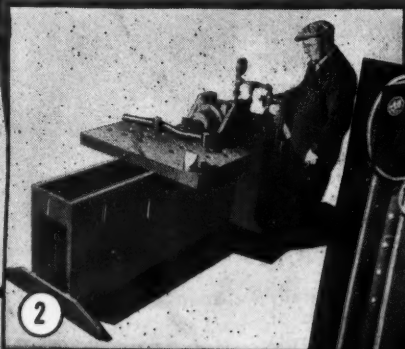
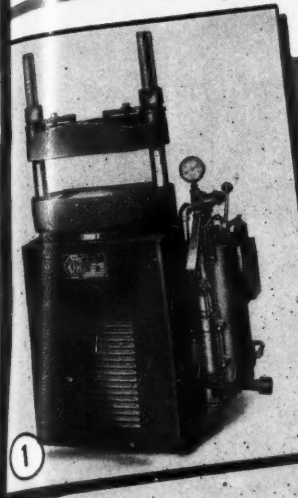
Built in 3', 4', 5' and 6' arm lengths.  
11" column, 12 spindle speeds.



**The MORRIS Machine Tool Co.**  
CINCINNATI 3, OHIO

# NAME IT... AND YOU CAN HAVE IT!

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Hydraulic Presses are available in capacities ranging from 25 to 100 tons and either hand-operated, air-rated or motor-driven.

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BUFFALO 3, NEW YORK

K. R. WILSON, 215 MAIN ST., BUFFALO 3, N. Y.

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Horizontal Presses ☐ Forming Presses ☐ Arbor Presses ☐

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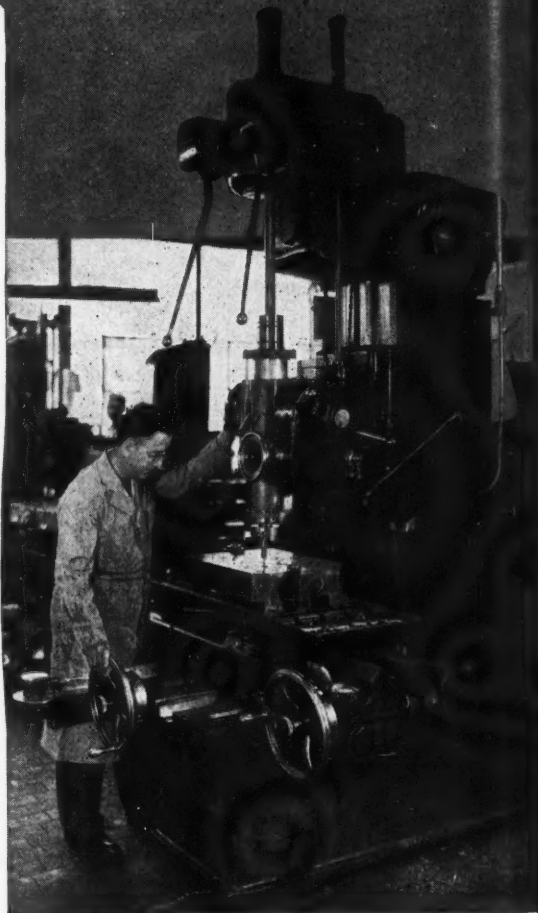
*Die and tool work demands accuracy of*  
**FOSDICK JIG BORER**

● On particularly close tolerance work, such as making the die illustrated, Fosdick Jig Borers are demonstrating their ability to meet the exceptional accuracy demanded in hundreds of tool rooms and tool and die shops.

The machine is exceptionally rigid—for example the bed of rugged construction is heavily ribbed to avoid distortion. A three point bearing serves for leveling and maintains perfect alignment. A sturdy sliding head supports spindle close to the work.

Operation is also very simple. All controls are centralized for ease of control. Twelve speeds in geometrical progression from 60 to 1500 RPM are instantly obtained through a single lever. Nine feeds from .00125 inch to .010 inch are available through a single control lever with direct reading index.

Thus the Fosdick Jig Borer offers all the advantages of high priced precision machines at a comparatively low cost. If you have a precision drilling—boring—facing or even light milling operation—put it on a Fosdick for speed—accuracy and low cost.



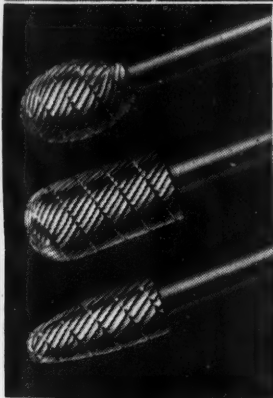
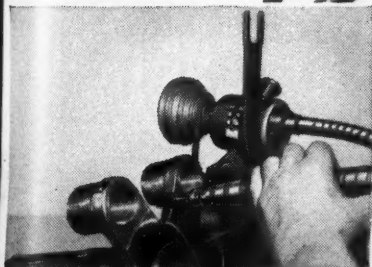
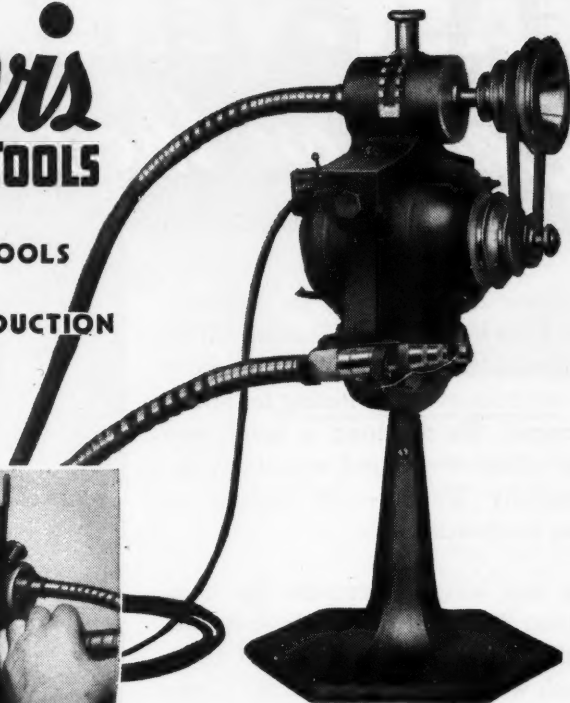
**A full descriptive bulletin is available—  
ask for Fosdick Jig Borer Bulletin M.S.J.**

**FOSDICK**

**MACHINE TOOL CO.**  
CINCINNATI 23, OHIO

# Jarvis POWER TOOLS

**HIGH SPEED TOOLS  
for  
HIGH SPEED PRODUCTION**



## **Jarvis Flexible Shaft Machines**

When used with correctly selected Jarvis Rotary Tools, these multiple-speed flexible shaft machines are the "power hands" of the metal working industry. They will perform many filing, grinding, sanding, buffing, brushing, cutting, and cleaning operations.

## **Jarvis Ground Rotary Files**

The recognized standard in thousands of manufacturing plants for fast, efficient performance. Now furnished with Jarvis Hy-speed Case, increasing tool life an average of three times. Send your high-speed steel rotary files back to Jarvis for regrinding. They will be furnished with life prolonging Hy-speed Case.

Send for our new catalog MFTI

**THE CHARLES L. JARVIS CO., MIDDLETOWN, CONN.**

TAPPING ATTACHMENTS • FLEXIBLE SHAFT MACHINES • GROUND ROTARY FILES



# FAST-VERSATILE

## *Easy on the Budget*

It almost has a "brain for drilling"! The husky, accurate "Buffalo" RPMster enables you to go from job to job without even hesitating for speed changes. By touching a lever, you can adjust to desired speed instantaneously. It's big — 99" high — yet easy to operate.

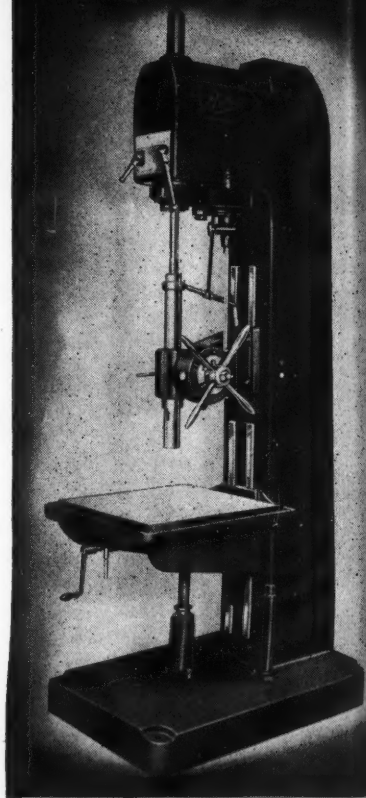
You can only appreciate the cost-cutting speed of the RPMster by actually operating one. Why not get in touch with us for all the facts . . . and see how an RPMster can handle your drilling and tapping jobs at remarkably low cost!

### BUFFALO FORGE COMPANY

388 Broadway

Buffalo, N. Y.

CANADIAN BLOWER & FORGE CO., LTD.  
KITCHENER, ONT.



*"Buffalo"*

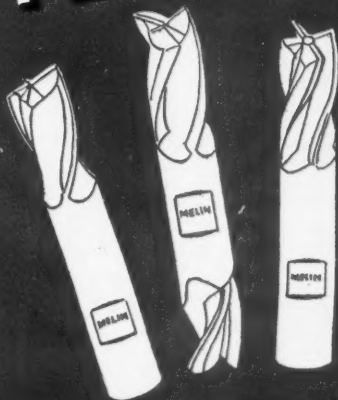
**RPM**

STER

# A New Catalog by MELIN Is Ready for YOU

**MAKER  
OF THE FAMOUS  
BOTTOM CUTTING  
3-FLUTE  
END MILLS**

## MELIN TOOLS



END MILLS — COUNTER BORES — CENTER DRILLS — COUNTERSINKS  
CORNER ROUNDING CUTTERS — DIE SINKING CUTTERS — ROUTER BITS

In addition to complete listings of sizes (up to 2") and prices on 2, 3, and 4 flute standard End Mills—the new Melin Tool Catalog includes complete data on the new line of:

**Counterbores**  
**Center Drills**  
**Countersinks**  
**Howard Rigid-Grip  
Tool Bit Holders**  
**Corner Rounding Cutters**  
**Die Sinking Cutters**  
**Router Bits**  
**Howard Live Centers**

**PLUS**—Many pages of valuable engineering reference data.

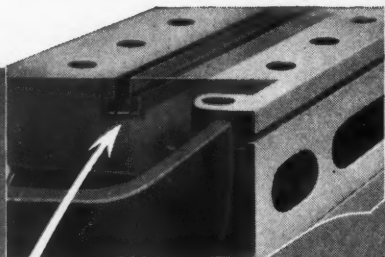
A request on your company letterhead will bring you a copy by return mail.

All Melin cutting tools are high speed tools, triple drawn for long life. All sizes are immediately available from stock.

# MELIN

## TOOL COMPANY, INC.

1331 Phillips, S. W. • Grand Rapids 7, Michigan  
3370 W. 140th Street • Cleveland 11, Ohio



Examine your old Planer Tables and then realize the advantages of the patented **HYPRO Steel Tee Slot Inserts**

- Prevents damage to tee slots by bolt heads
- Prevents pulling out of tee slots
- Insures perfect condition of table thruout life of machine
- Facilitates removal of chips as they will slide freely on the smooth steel not requiring a special tool to remove them
- Can be renewed if necessary

*Here's where the wear begins*

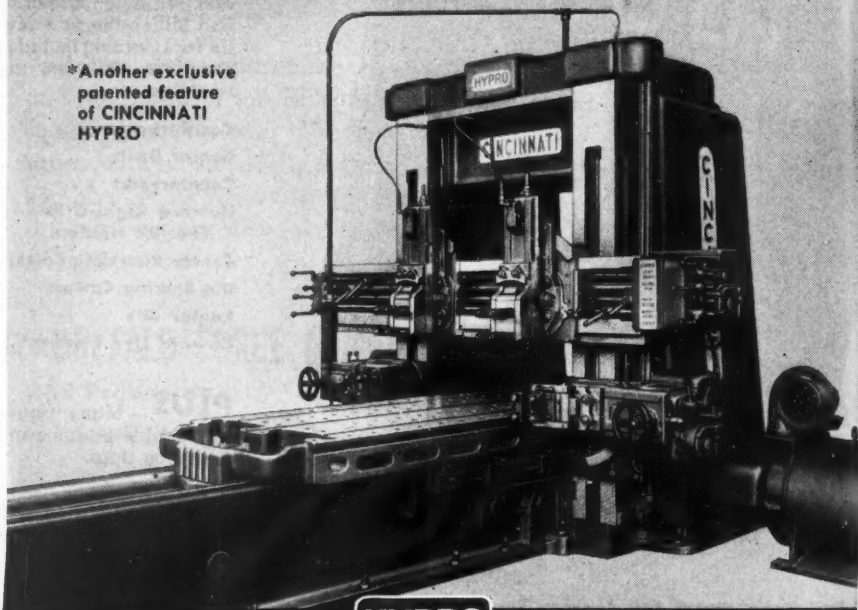
ON AN ORDINARY PLANNER TABLE

... but not on a **CINCINNATI HYPRO**

BECAUSE IT IS EQUIPPED WITH

**\* STEEL TEE SLOT INSERTS**

\*Another exclusive patented feature of **CINCINNATI HYPRO**



**THE CINCINNATI HYPRO PLANER COMPANY**

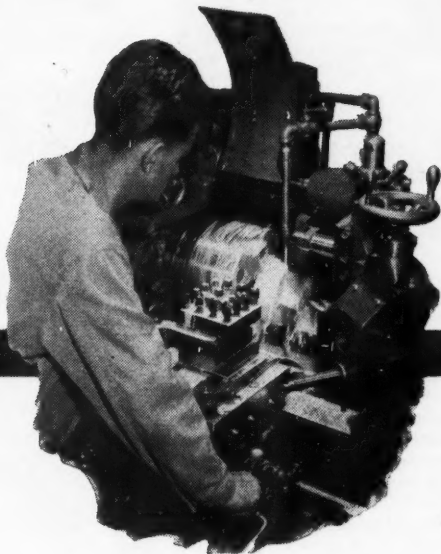
PLANERS - BORING MILLS - PLANER TYPE MILLERS

**CINCINNATI, OHIO**

# TODAY'S "BARGAIN"...

## A dollar's worth of production

### for \$1<sup>35</sup>



...TAT's another way of saying that the cost of producing one unit in the metal turning industry increased over 35% since 1939.

...ow it costs \$1.35, for the *same* machine, operated by the *same* man, to produce the *same* volume that years ago cost only \$1.00.

...facturers must realize that to combat this rise in material, labor and overhead costs they must either raise prices (with the subsequent danger of pricing themselves out of the market) or boost production.

...ay to step up output is clearly defined. With over the machine tools used in private industry 10 years or older, much can be done to improve machine efficiency. Your nearest Warner & Swasey field

engineer can suggest ways for doing this in your plant, either through new accessories, improved tooling set-ups or by replacing obsolete machines with new Warner & Swasey Turret Lathes or Multiple Spindle Automatics.



*You can machine it better, faster, for less...  
with a Warner & Swasey*

TURRET LATHES, MULTIPLE SPINDLE AUTOMATICS, PRECISION TAPPING & THREADING MACHINES

## Cut tool costs

with APEX sockets and wrenches

You drive down your tool cost when you standardize on Apex sockets and wrenches. *Reason one:* Apex production sockets are accurately machined from electric-furnace high-carbon alloy bars—cold broached and carefully heat-treated for maximum strength, wear, and shock resistance. *Reason two:* these sockets and wrenches can be furnished—on request—to definite hardness specifications, for top service on specific jobs. *Reason three:* Apex sockets stay on the toughest jobs (driving self-tapping screws, for example) as much as three times longer than ordinary sockets.

Select from thousands of standard items—or if you need specials, send a sketch, print, or description, and we'll quote promptly. Write for Catalog 13.

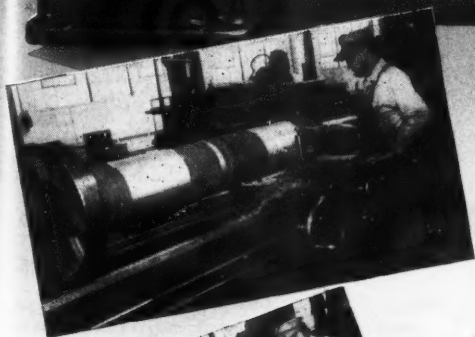
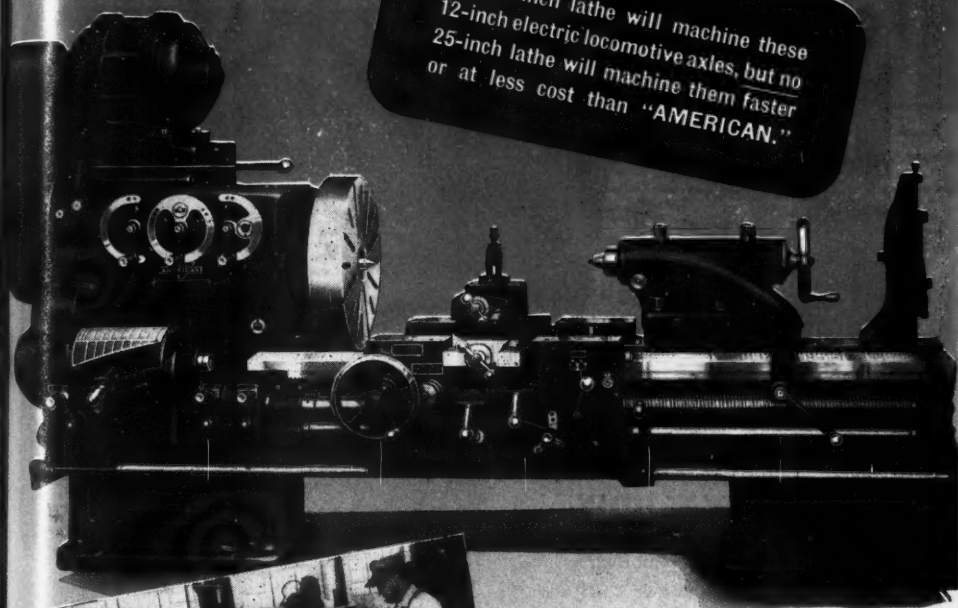
THE APEX MACHINE & TOOL CO.  
1028 South Patterson Blvd., Dayton 2, Ohio

# APEX SOCKETS

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft and Industrial Universal Joints; Sockets and Universal Joint Socket Wrenches.



Any 25-inch lathe will machine these  
12-inch electric locomotive axles, but no  
25-inch lathe will machine them faster  
or at less cost than "AMERICAN."



The tremendous power of the 25-inch "American" High Duty Lathe permits the use of cemented carbide cutting tools at full capacity.

Many of these lathes are operating constantly to the limit of 30 horse power driving motors.

Their inherent stamina insures the heaviest cuts without vibration.

The thorough and careful processing of all transmission elements produces the fine finish required by this type of work.

"AMERICAN" LATHES IN YOUR SHOP  
MEAN HIGH QUALITY AT LOW COST.

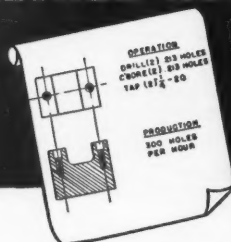
**THE AMERICAN TOOL WORKS CO.**

**Cincinnati, Ohio, U. S. A.**

*Lathes and Radial Drills*



# Avey Automatic METHOD No. 4



## THE Avey CAM FEED UNIT

No. 1 Size—1/2" capacity in cast iron.

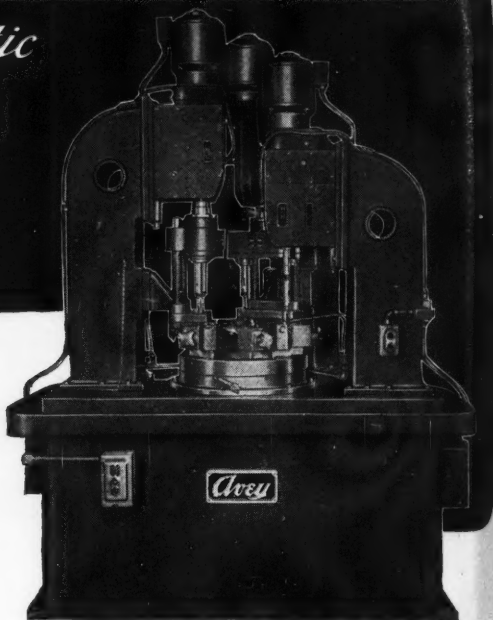
No. 2 Size—7/8" capacity in cast iron.

**designed for multiple  
operation on individual  
holes--drilling, counter-  
boring (reaming or re-  
drilling) and tapping at  
one clamping of work**

THE AVEY DRILLING MACHINE CO.  
CINCINNATI • OHIO • U. S. A.

Send for Engineering  
Bulletin 645

By Invitation Member



Accelerated production obtainable by free loading time and multiple operations on several parts simultaneously in normal time required for one operation.

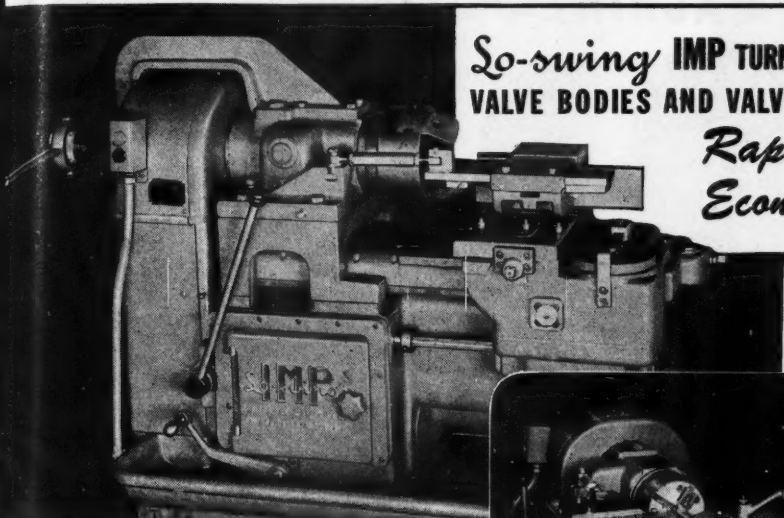
Method No. 4. Lower cost per part—higher production per capital investment—greater accuracy by semi-skilled operators delivering high quality production speedily, accurately, efficiently with a minimum of supervision.

# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

**Lo-swing IMP TURNS AND FACES  
VALVE BODIES AND VALVE KEYS . . .**

*Rapidly and  
Economically*

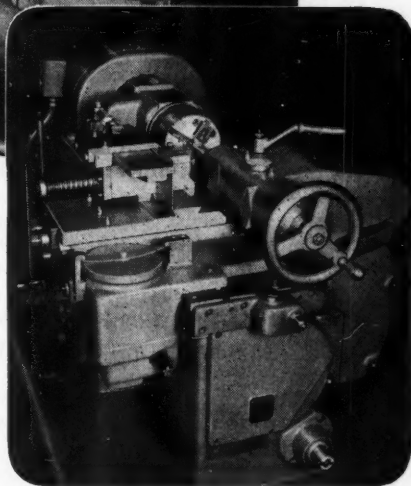


**Problem:** To taper bore and back face the Valve Body and taper turn the Valve Key.

**Solution:** Lo-swing IMP Lathes were selected for both operations because its spindle bearings permit high spindle speeds required for turning bronze alloy and its carriage design assures unusual turning accuracy and provides protection for the ways of the bed which are completely covered at all times.

Illustration above shows the equipment for taper boring the Valve Body and facing the small end. The boring bar is controlled by an adjustable template clearly shown in the illustration. The piece is rough bored with a coarse feed on the forward stroke and finish bored with a fine feed on the return stroke. The cross slide cam automatically feeds in the tool .005" on the return stroke. The end facing operation is made with a special tool holder located in the headstock spindle bore. The operation consists of clamping the pieces in the chuck, the operator then pulls the starting lever and the facing tool lever, after which the rest of the operation is entirely automatic.

Close-up illustration at right shows the equipment for taper turning the Valve Key. The turning tool in this operation is also controlled with an adjustable



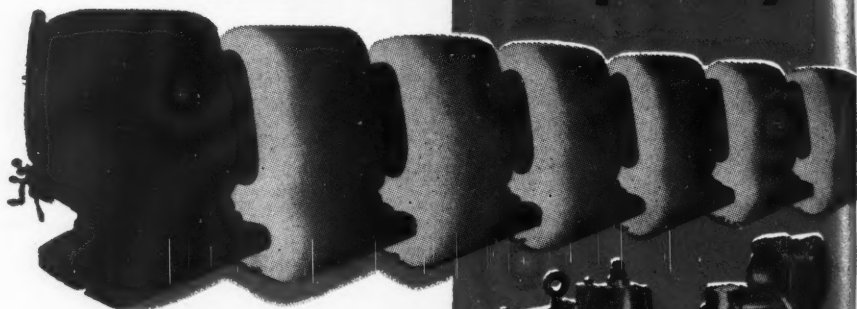
template and the key is rough turned on the forward stroke and finish turned on the return stroke by the same method employed for the boring of the Valve Body. The operation consists of loading the piece between centers and pulling starting lever, the remainder of the operation is entirely automatic.

Let Seneca Falls Engineers help you solve your machining problems.

**SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.**

**LATHE NEWS from SENECA FALLS**

# Multiply YOUR MILLING MACHINE Job Capacity



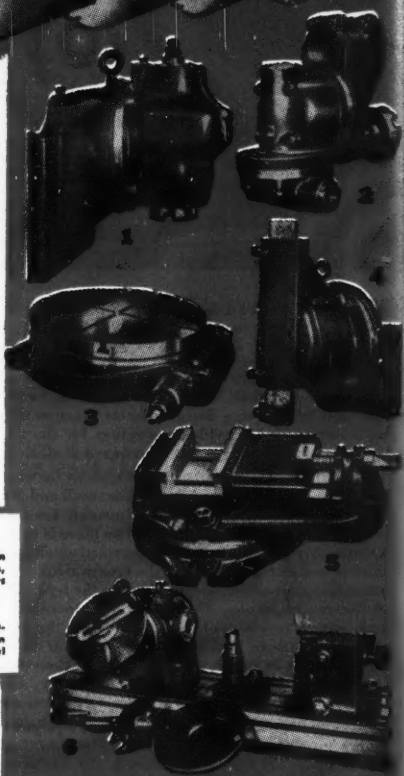
Do you want to increase the productive-ness of your standard milling machines? Then consider the application of Kemp-smith standard attachments. These de-pendable, precision-built tools are made to perform the most delicate milling opera-tions with both speed and accuracy. They are the product of 57 years' specialized experience, manufacturing milling ma-chines exclusively. The same high degree of rigidity and precision, characteristic of Kempsmith Milling Machines, is embodied in these standard attachments. It will pay you to investigate. Write for literature.

## THE KEMPSMITH MACHINE CO.

MILWAUKEE 14, WIS., U. S. A.

### KEMPSMITH Standard Milling Attachments

- 1 VERTICAL HEAD** con-verts horizontal to vertical machine, retain-ing identical spindle characteristics
- 2 HI-SPEED UNIVER-SAL** for high speed angular milling in all planes.
- 3 CIRCULAR TABLE** for milling circles or cams, gear cutting, high-speed continuous mill-ing, etc.
- 4 SLOTTOR** for keyseat-ing, broaching, gen-eral slotting, tool and die making, etc.
- 5 VISES**, both plain and swivel types, adaptable to special jaws to save fixtures.
- 6 UNIVERSAL DIVID-ING HEAD** for plain indexing and spiral milling



# KEMPSMITH

*Precision Built Milling Machines Since 1888*

A 5003-17-C



*Specify Adams*

for high quality gears  
made **EXACTLY** to  
your specifications

Regardless of quantity or type, you'll profit by specifying Adams custom made gears for your product. Made on the most modern gear cutting machines by skilled workmen, Adams gears are quality controlled to guarantee exact conformance to your specifications. Write for further information, today. THE ADAMS COMPANY, 1942 Cypress St., Dubuque, Iowa.

**the ADAMS company**  
**Dubuque, Iowa, U. S. A.**

ESTABLISHED 1883

FINE GEARS MADE TO  
YOUR SPECIFICATIONS



# THERE'S A **VAN NORMAN** RAM TYPE

- ★ *Heavy cutterhead permits horizontal, vertical and angular milling.*
- ★ *Moveable ram increases versatility and work range.*
- ★ *Precision construction assures accuracy and long life.*

Van Norman ram type millers are available in 16 models to meet practically any milling requirement in tool rooms, machine shops, pattern shops, tool, die and mold shops and production departments.

These milling machines feature such outstanding advantages as—

Conventional Horizontal and Vertical as well as angular Milling over a wide range minimizing work setups and idle machine time

Maximum cutability assured by heavy-duty rugged construction

Accurate work resulting from built-in precision

Front and rear power feed controls (except No. 12 and No. 6 models) for greater convenience of operation

Hardened and lapped alloy steel gears rotating on anti-friction bearings assures quiet long-life operation.

Investigate Van Norman Ram Type Millers, today. They are available with plain and universal saddle. Models providing greater vertical range are also available. Write for information and catalog.

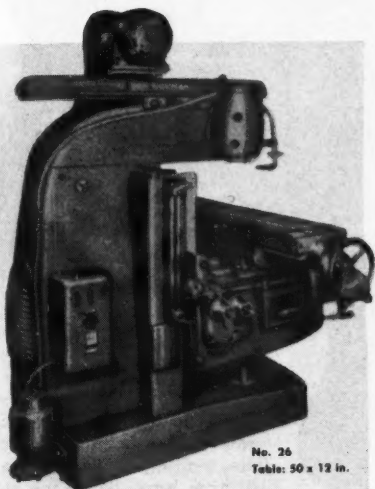


**VAN NORMAN COMPANY**  
*Springfield 7, Mass.*

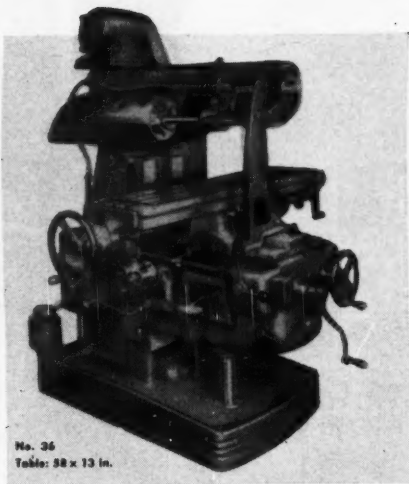
*"It pays to Van Normanize"*



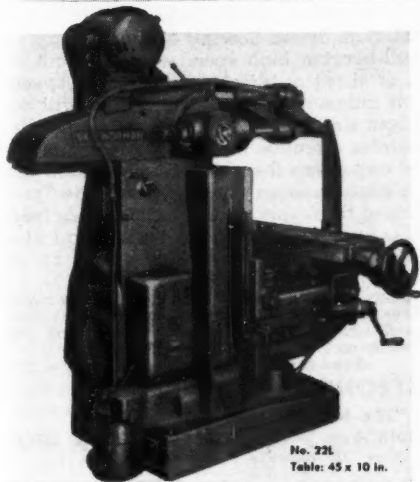
## MILLER TO MEET EVERY REQUIREMENT



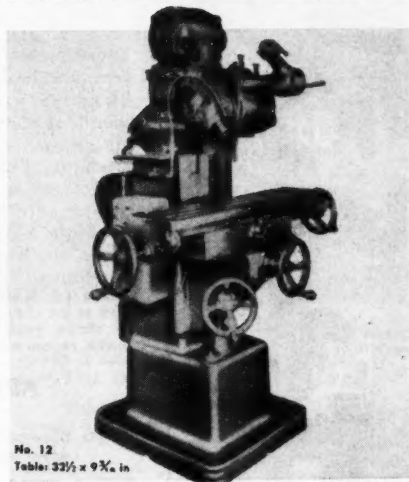
No. 26  
Table: 50 x 12 in.



No. 36  
Table: 58 x 13 in.



No. 22L  
Table: 45 x 10 in.



No. 12  
Table: 33½ x 9¾ in.

**VAN NORMAN COMPANY**

*Springfield 7, Massachusetts*



## No "waiting" cost here!

There are no costly delays, no men and machines standing idle, waiting for stock to be cut off from bars, when the stockroom is equipped with a No.

6A or 9A MARVEL High Speed Sawing Machine. These fast, all-ball-bearing high speed saws will cut off accurate lengths or slices at almost unbelievable speed. Equipped with an automatic bar push up, they will cut identical pieces from single or nested bars automatically, with no more operator attention than an automatic screw machine. Still, at any point, the automatic operation can be interrupted, a miscellaneous cut made, and the "production" run resumed by simply re-engaging the bar feed. A single MARVEL Automatic can keep well ahead of a large machine shop, increasing the earning time on all machines.

There is a MARVEL Saw for every need—in every capacity range and price class. Your local MARVEL Sawing Engineer will gladly study your metal sawing problems and requirements and make recommendations as to methods and equipment.

Send for Catalog.

### ARMSTRONG-BLUM MFG. CO.

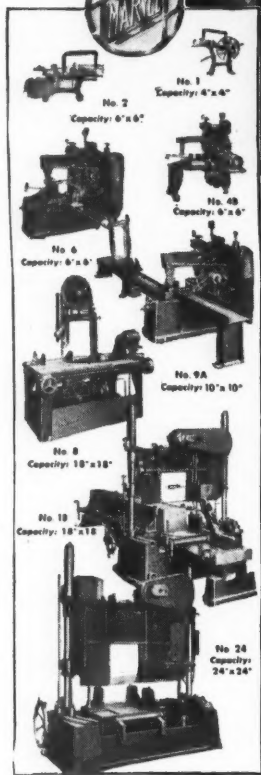
"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago 39, U.S.A.

Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

# MARVEL SAWS

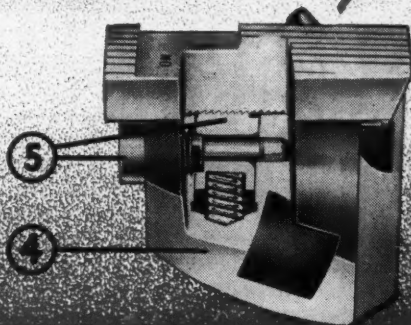


# Five Good Reasons Why...

## JONES & LAMSON

*Ground Thread*

### TANGENT CHASER DIE HEADS



## PRODUCE BETTER THREADS at LOWER COST!

#### THREAD QUALITY

1. They are hardened and ground throughout. The body is lapped on the face and in the dovetail slots. Chaser holder bearing surfaces are lapped into the body.
2. Chasers are guaranteed to produce threads of Class III fit.
3. Exact helix angle is ground into the chasers after hardening.

#### ECONOMY

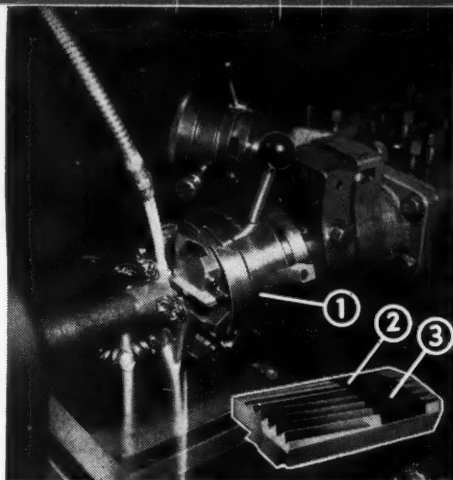
4. Dies are universal, therefore investment in chaser holders is reduced to a minimum and change-over and set-up are speeded.
5. Chasers are set quickly and easily.

If you are interested in greater economy and better quality in threading, fill in the coupon and we will send you our valuable handbook "Thread Elements and Formulas", together with complete information about our Die Heads.

**JONES & LAMSON**  
MACHINE COMPANY  
Springfield, Vermont, U. S. A.



Manufacturer of: Universal Turret Lathes, Fay Automatic Lathes, Automatic Double-End Milling and Centering Machines, Automatic Thread Grinders, Optical Comparators, Automatic Opening Threading Dies and Chasers, Ground Thread Flat Rolling Dies.



**JONES & LAMSON MACHINE COMPANY**  
DEPT. 710A, SPRINGFIELD, VERMONT, U.S.A.

Please send me your handbook "Thread Elements & Formulas", and complete information about your Threading Dies.

NAME

TITLE

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ADDRESS

MMS

COUPON

*With a Small Investment—*  
**the SUNNEN**  
**PRECISION HONING MACHINE**  
 Will Accurately Finish All Internal  
 Diameters from .125" to 2.625"

**T**he wide range of sizes which the Sunnen Precision Honing Machine will handle makes it adaptable to thousands of jobs in production plants, tool and die shops, maintenance shops and salvage departments. Honing heads and stones are available to hone any kind of metal, plastic or ceramic material except lead and babbitt.

Accuracy is guaranteed to be within .0001" —and on such materials as hardened steel it has been held to .000025" on production jobs. Surface finishes can be produced to meet any commercial requirement.

The Sunnen Precision Honing Machine does not require skilled help. No jigs or fixtures are needed —it can be put to work immediately. Low in cost —economical to operate.

A Sunnen engineer will be glad to show you how you can apply Sunnen honing to your jobs, in your plant. Write for complete details. Ask for bulletin XSP5000.

**SUNNEN PRODUCTS COMPANY, 7933 Manchester Avenue, St. Louis 17, Missouri**

Canadian Factory: Chatham, Ontario

194

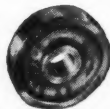
*Typical Examples*



Miniature aircraft cylinder—smooth, accurate honing provides better compression and longer life.



Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.



Aircraft Valve Tappet Roller. Honed after grinding to give 100% bearing surface.

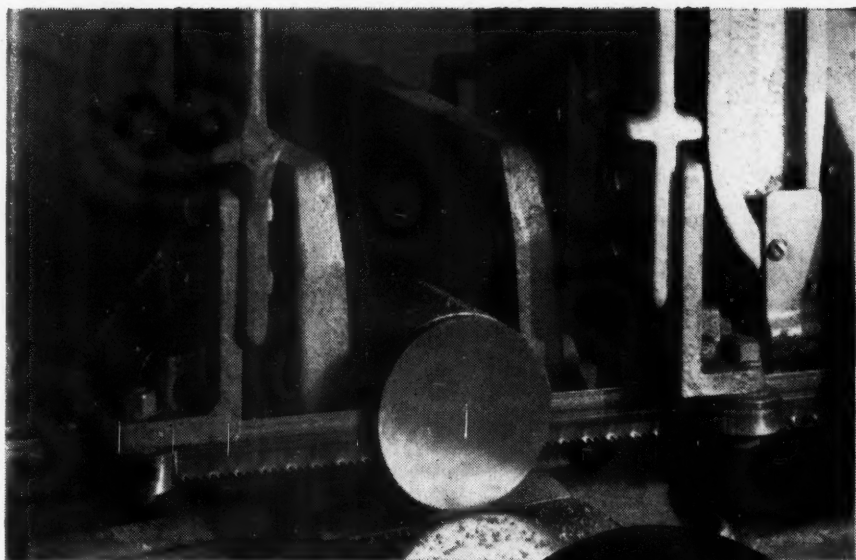


Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Hydraulic Two-Way Control Valve. Hole is honed to eliminate leakage.





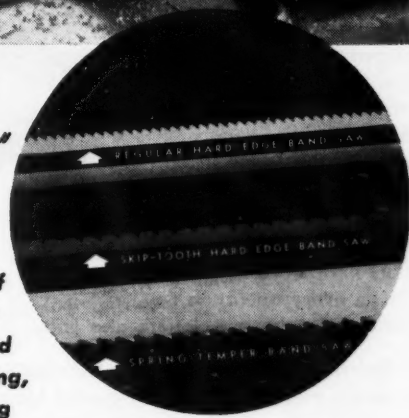
## Climb on the **SIMONDS** "BAND-SAW WAGON"



**Save Thousands of  
Hours by Band-Saw  
Cutting . . . instead  
of Shaping, Milling,  
Turning, Drilling**

Getting to be a "Big Parade" . . . the way shops are swinging to metal band-sawing . . . and keeping their one-purpose machines free to do the work for which they were designed.

Simonds Metal-Cutting Band Saws can do a score of jobs, and do them all at top speed and accuracy . . . cut-off work, contour cutting, and cutting of irregular shapes like jigs, dies, fixtures, as well as heavy straight production cuts . . . and many other similar jobs.

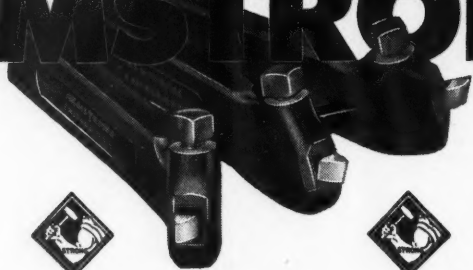


And Simonds Metal Bands earn top profits on these jobs because they're made to *stay* on the job many hours longer . . . running smoothly, easily, cleanly. Simonds special steel, perfect tooth-milling and even tooth-set . . . those are the Simonds *extras* that *pay you extra* on every Simonds Metal Band you buy. Order from your distributor today.

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 9, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. Canadian Factory: 395 St. Remi St., Montreal 30, Que.



# ARMSTRONG



## You personally profit from ARMSTRONG TOOL HOLDERS

Whether yours is a "job" or a "position" you are vitally concerned with profits, for it's from profits that wages and salaries are paid. Personally concerned with profits, you should be interested in ARMSTRONG TOOL HOLDERS for they permit extra profits on every operation on lathes, planers, slotters and shapers.

Before ARMSTRONG TOOL HOLDERS, a blacksmith hammered out special tools for each operation, while men and machines stood idle as he fashioned, re-sharpened and re-tempered these cumbersome forgings. Now, with multi-purpose ARMSTRONG TOOL HOLDERS, any mechanic can grind his own cutter-bits from standard high speed steel shapes.



Tooling-up is a matter of minutes, with savings of "All Forging, 70% Grinding and 90% High Speed Steel" in direct tool cost.

Today, there are ARMSTRONG TOOL HOLDERS for every operation, including special tool holders for cast-alloy and carbide-tipped cutters. Embodying the "Know-how" developed thru more than 50 years of specialization, they do every operation faster,

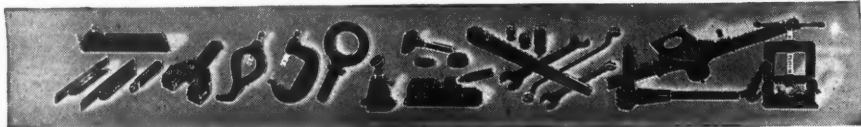
safer, more accurately . . . at lower cost and a higher profit.

See that ARMSTRONG TOOL HOLDERS are used wherever possible for greater profit. They are cataloged and stocked by all leading Industrial Distributors.

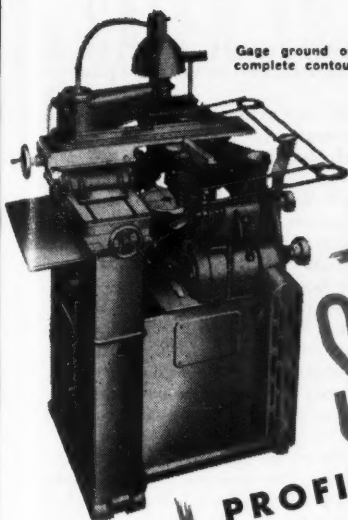
## ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

328 N. Francisco Avenue Chicago 12, U.S.A.  
San Francisco and New York







Gage ground on complete contour



Various radius gages ground from same template



Circular form tool produced in 2½ hrs.

Profile gage 2.4" long ground in 4 hrs.

# STUDER

## PROFILE GRINDER

### VERSATILITY!

Grind straight or round form tools, sectional dies, templates, small dies and precision parts! Work up to 6" in length, 4" in diameter, 2" in thickness can be handled. Special template holder permits grinding of circular contours over entire circumference.

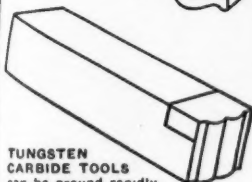
### SPEED!

Only one set up is necessary for grinding any shape in one continuous operation, without removing work piece or template. Several flat pieces may be stacked for simultaneous grinding. Small profiles can be accurately produced without preliminary grinding to form, and clearances on parts such as form tools can be ground without changing the original setting.

### ACCURACY!

A tracer finger follows the form of a template and transmits its movements to the grinding wheel through a pantograph. Because the wheel is shaped proportionately to the exact shape of the tracer finger, parts are ground complete in one operation. Fixed template eliminates errors due to incorrect manipulation. These features insure accuracy to within  $\pm 0.0002"$ . Our engineers will give you expert assistance in specific applications.

Set of profile gages produced in 3 hrs.



**TUNGSTEN CARBIDE TOOLS** can be ground rapidly and accurately with the Studer Profile Grinder. A special diamond wheel dressing device, equipped with a Carborundum cup wheel, assures accurate forming of bakelite and metal bonded wheels.



Form tool ground on complete contour

**C O S A**  
CORPORATION



CHRYSLER BUILDING  
New York 17, New York

# HOW TO SQUARE A CIRCLE

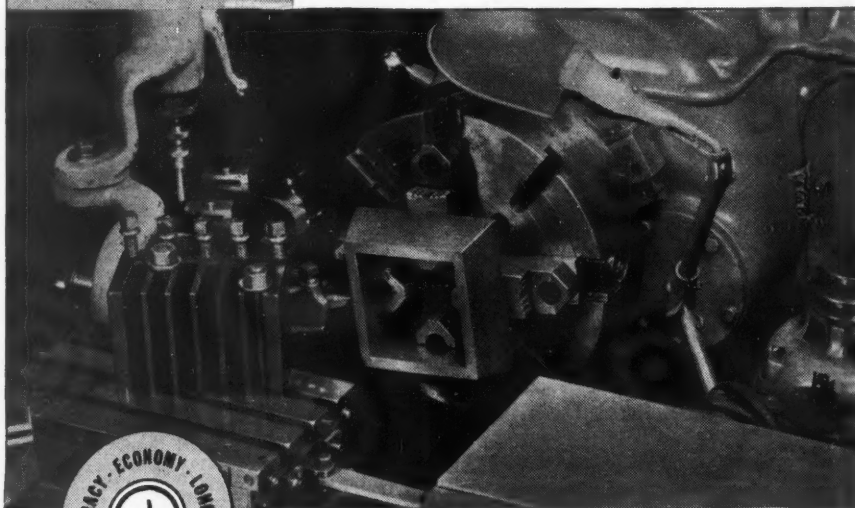
with Monarch's  
Shapemaster  
Lathe

That's right—we're actually *turning* a square—on a lathe!

But that's not all—we've bored the square, too, on a taper—and a square is only *one* of an almost infinite variety of shapes we can turn; ovals, stars, triangles, flutes (even up to 500 of 'em, flat, convex or concave). We can blend from a round to an oval or a hexagon or a square or any other shape. In addition, we can produce sharp, clean-cut corners in recessed or exterior angles. Fact is, we can turn or bore almost any conceivable contour that allows room for a tool point.

*You can do it, too.* All you need is the famous Monarch Shapemaster Lathe. Think what that means—intricate, costly dies *turned* on a machine, to exacting tolerances—in a fraction of the time required for handwork—and at a fraction of the cost!

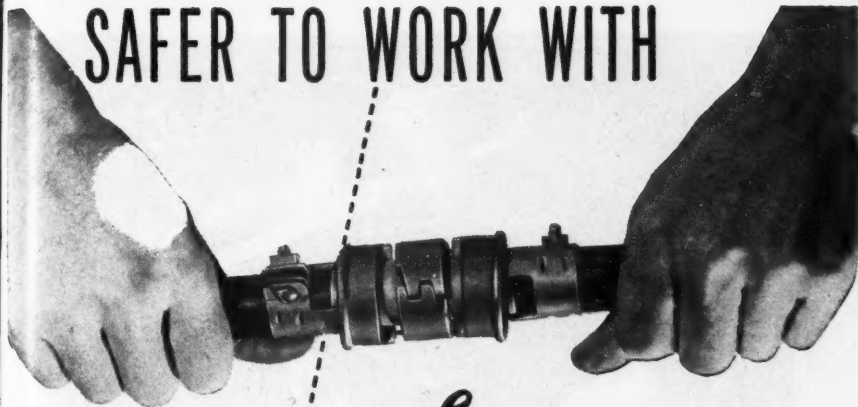
If you're doing die work—or any contour turning in metal—you owe it to yourself to investigate the Shapemaster. Like more facts? We'll be glad to oblige. Just write to The Monarch Machine Tool Company, Sidney, Ohio.



For complete factual and pictorial information on how the famous Monarch Shapemaster can save you time and money in the precision production (or reproduction) of dies, write for your copy of Bulletin 2501.



# SAFER TO WORK WITH



*To connect, place ends to-gether,  
push and twist—they snap lock.*



*To disconnect, simply  
pull back sleeves*



*... jaws open automatically.*

## Thor

### AIR HOSE COUPLINGS

Thor Air Hose Couplings cannot break, jar or whip apart. Tool operators prefer the simplicity . . . and speed with which they can be connected and disconnected. All sizes and combinations are interchangeable. Each hose end is identical—no right or left . . . no male or female—a real universal coupling that fits every job. Ask your nearby Thor distributor for full information.

**INDEPENDENT PNEUMATIC TOOL COMPANY**

600 W. Jackson Boulevard, Chicago 6, Illinois

BRANCHES IN PRINCIPAL CITIES

... *Thor* . . . **PORTABLE POWER**  
**TOOLS**

**PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY  
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS**



**"ONE LATHE GETS YOU TWO"...**

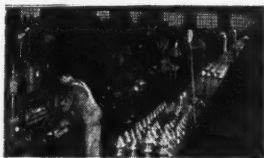
## IF IT'S A *DUOMATIC*

Lodge & Shipley Duomatics (multiple tool automatic lathes) are like **TWO LATHES IN ONE** . . . dual tool slides, front and rear, operate singly or simultaneously . . . frequently double production. One noted truck manufacturer reports their 3-A Duomatics increased production of transmission mainshafts by 250% . . . more than double.

On large or small lots, an endless variety of parts are machined with 2-A or 3-A Duomatics\*—this modern machining marvel actually takes over from the moment the operator

loads the work-piece. Even complex parts are accurately duplicated without further attention.

\*Write on your company letterhead for Bulletins 634 and 635 on the 2-A and 3-A Duomatics.

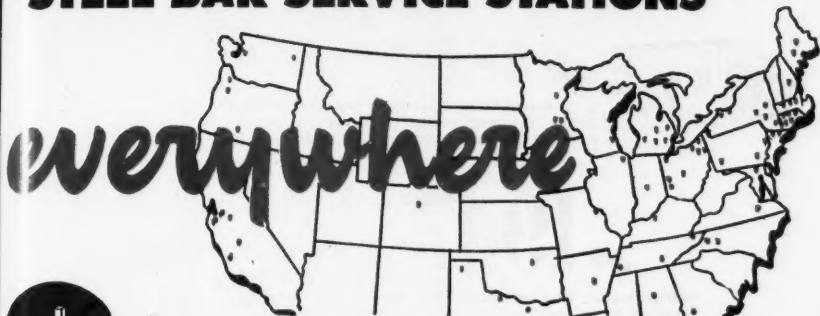


**THE *LODGE & SHIPLEY* COMPANY**

CINCINNATI 25, OHIO, U. S. A.

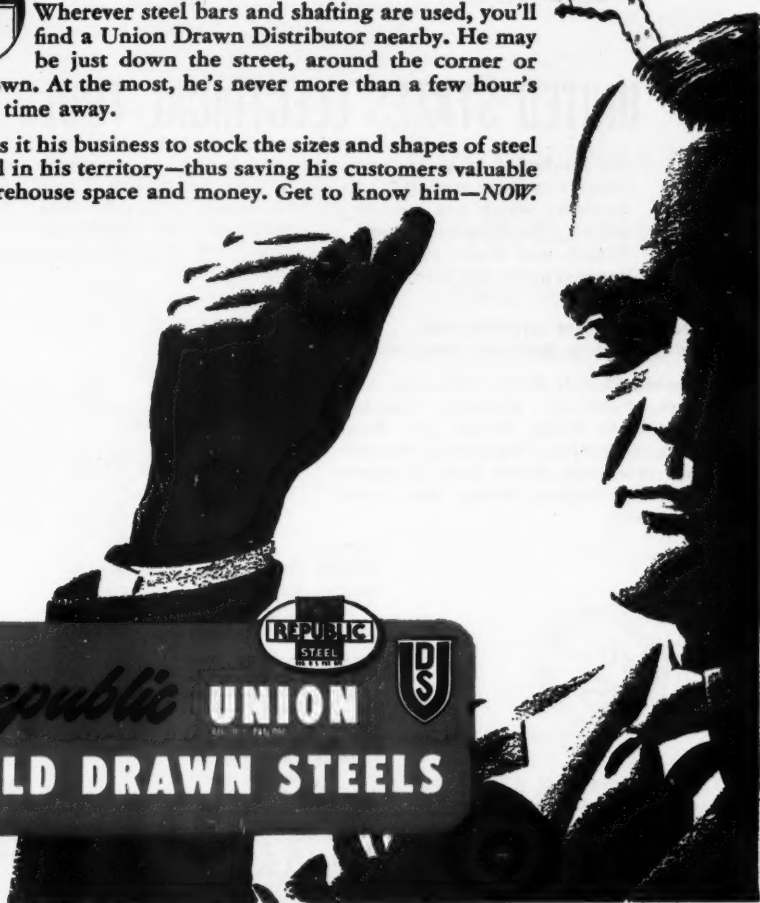
MACHINE TOOL DIVISION 3055 COLERAIN AVE. • SPECIAL PRODUCTS DIVISION 800 EVANS ST.

## "STEEL BAR SERVICE STATIONS"



Wherever steel bars and shafting are used, you'll find a Union Drawn Distributor nearby. He may be just down the street, around the corner or across town. At the most, he's never more than a few hour's trucking time away.

He makes it his business to stock the sizes and shapes of steel bars used in his territory—thus saving his customers valuable time, warehouse space and money. Get to know him—NOW.





*in* 1897

a practical idea conceived by Col. John A. Smith, brilliant American inventor, internationally known engineer, practical mechanic.

*in* 1947

indispensable and internationally chosen for production or maintenance where cost-savings are imperative.



## UNITED STATES ELECTRICAL TOOLS

The evolution of electrically operated tools . . . portable, bench and floor models . . . is linked with the growth of this company which has become so intertwined with American industry in all phases. And . . . UNITED STATES ELECTRICAL TOOLS are their own "living proof" of what constant improvement has wrought.

**CONTACT YOUR DISTRIBUTOR . . .  
ASK HIM FOR DETAILS AND PRICES**

Portable Electric Drills, Grinders, Sur-  
facers, Polishers, Sanders, Tappers,  
Saws, Hole Saws, Bench and Floor  
Grinders, Buffers, Polishers, Flexible  
Shaft Machines, Valve Seat Grinders,  
Valve Refinishing Shops, and many  
other tools.



### UTILITY FLOOR GRINDERS MODEL 500

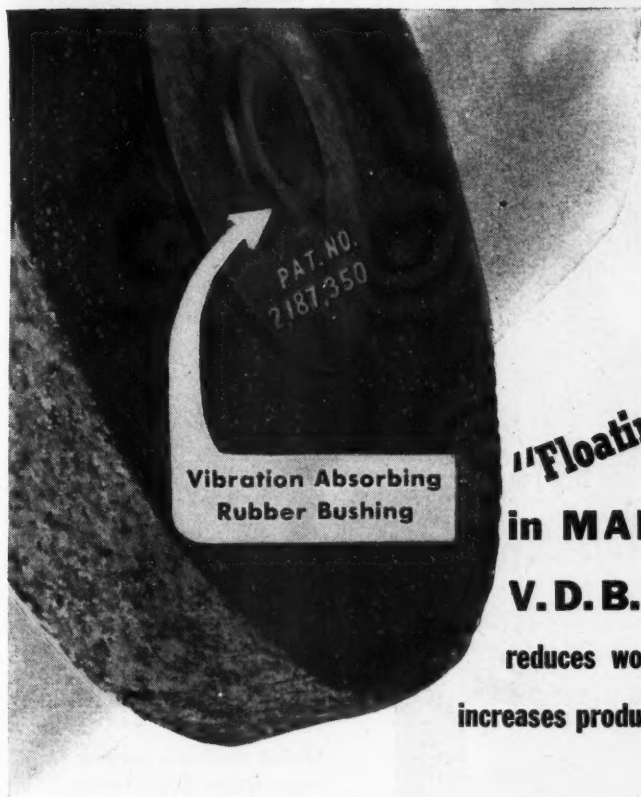
Ball Bearing  
12, 14 and 18" wheels

Totally enclosed mo-  
tor; push button start-  
er for overload pro-  
tection, ball bearings  
enclosed in dust-tight  
 housings, enclosed ad-  
justable wheel guards.



**The UNITED STATES ELECTRICAL TOOL Co.**  
CINCINNATI, OHIO





**Vibration Absorbing  
Rubber Bushing**

**"Floating Power"**

**in MANHATTAN**

**V.D.B. WHEELS**

**reduces worker fatigue and**

**increases production and quality**

Men like them because they reduce fatigue and strain. Freed from the tiresome vibration, chatter or jumping of the grinder in their hands, operators guide the wheels with greater accuracy. More work is done with less effort.

With a Manhattan Vibration Dampener Bushing reducing wear and tear, you find both the wheel and the portable grinder last longer, too. Maintenance costs go down and the shop shows a better profit.

... Big results from a little thing like a vibration absorbing rubber bushing, but a trial and comparison proves how savings are accumulating for present users.

The Manhattan V.D.B. Bushing and Wheel are sold as a unit in straight types up to 8" in diameter. Sold direct by the

**ABRASIVE WHEEL DEPARTMENT**



**RAYBESTOS-MANHATTAN INC.**

*Keep Ahead with Manhattan*

**MANHATTAN RUBBER DIVISION**

**PASSAIC, NEW JERSEY**

April, 1947

MODERN MACHINE SHOP • 39

A method to hold the "off piece" and eject it after cut has been made — developed by The Dielectric Co. engineers



**Above:** Closeup of plunger-type "hold-down" fitted to saw arm. On down-stroke of arm, this special jig contacts the work on the outboard side of the saw blade; tubing or bar is held securely until the cut is finished. There is no buckling to jam blade; blade breakage is eliminated . . . the finish of sawed ends is improved.

**Below:** Closeup of trigger arrangement for actuating pneumatic ejector. The up-stroke of the saw frame releases holding finger and starts an air blast that blows cut stock along guide rail into tote pan fitted to side of machine. This increases production speed.



### Quick delivery now from your Delta Distributor . . .

at a cost that is but a fraction of the usual price for machines of this type.

**Abrasive Model:** Spindle speed 4000 R.P.M. Surface speed 10,500 feet per min. Wheel 10" diam.  $\frac{1}{2}$ " arbor hole. Wheel flanges two sizes  $3\frac{1}{2}$ " and 5" diam. Circular table and wheel swing  $45^\circ$  left and right, providing full  $90^\circ$  range of cut. Height of table from floor 32". Size 30" wide, 35" deep, 47" high. Complete unit for 60, 50, or 25 cy. or D.C. service. Without abrasive wheel, motor, or switch. Shipping Wt. 570 lbs. . . . Catalog No. 20-210 . . . \$181.00

**Non-Ferrous Model:** Spindle speed 2000 R.P.M. Surface speed 5250 feet per min. Blade 10" diam.  $\frac{1}{2}$ " arbor hole. Circular table and blade swing  $45^\circ$  left and right, providing full  $90^\circ$  range of cut. Height of table from floor 32". Size 30" wide, 35" deep, 47" high. Complete unit for 60, 50, or 25 Cy. or D.C. service. Without saw blade, motor, or switch. Shipping Wt. 550 lbs. . . . Catalog No. 20-305 . . . \$188.00

# Another manufacturer enjoys the accuracy of the low-cost Delta\* Cut-Off Machine . . . for cutting to exact length on a production basis

Accuracy to within .001 inch — that's the kind of precision performance The Dielectric Products Co., Jersey City, N.J., gets from a Delta Cut-Off Machine. The operation is cutting copper tubing and copper and brass bars into various standard lengths.

The Delta Cut-Off Machine is available in two models: (1) With abrasive wheel, for cutting high-speed steel and cold-rolled steel bars and sections up to the equivalent of  $\frac{3}{4}$ " solid round stock . . . steel tubing up to  $1\frac{1}{4}$ " diameter and approximately  $5/32$ " wall thickness . . . Duralumin Tobin bronze, Navy bronze, other very hard non-ferrous metals; (2) With special steel blade, for cutting soft brass, aluminum, copper, mica, and other non-ferrous metals — in solid sections up to  $1\frac{1}{2}$ " diameter . . . in

tubular sections up to 2" diameter. Also adaptable for wet cutting operations, with the addition of the coolant pan. The Delta Non-Ferrous Cut-Off Machine cuts sharp and clean; you eliminate the expense of additional finishing operations.

Enjoy economical, trouble-free cut-off performance: Equip with Delta Cut-Off Machines. Order from your Delta distributor. He is listed under "Tools" in the classified section of your telephone directory.

Check coupon below for Bulletin A-20.



**DELTA**  
MILWAUKEE

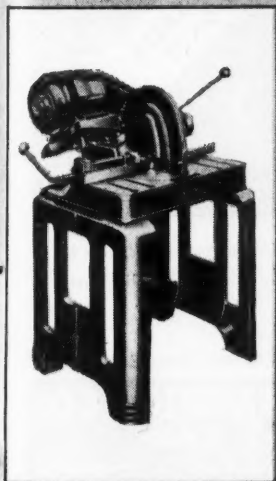


## Delta Manufacturing Division

Rockwell Manufacturing Co.  
Milwaukee 1, Wis.

\*Trade Mark Reg. U. S. Pat. Off.

M-22A



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The complete line of Delta Machine Tools also includes Drill Presses (see Bulletins A-14, A-14-3, and A-17) . . . Metal-Cutting Band Saw (see Bulletins A-23) . . . Abrasive Finishing Machines (see Bulletin A-32) . . . Toolmaker\* Surface Grinder, Chip-Breaker Grinder, Tool and Cutter Grinder, Carbide Tool Grinder, Industrial Tool Grinder (see Bulletin A-23) . . . Coolant Pumps and Tank (see Bulletin A-49).

# "BEARING DOWN" ON BEARING COSTS!

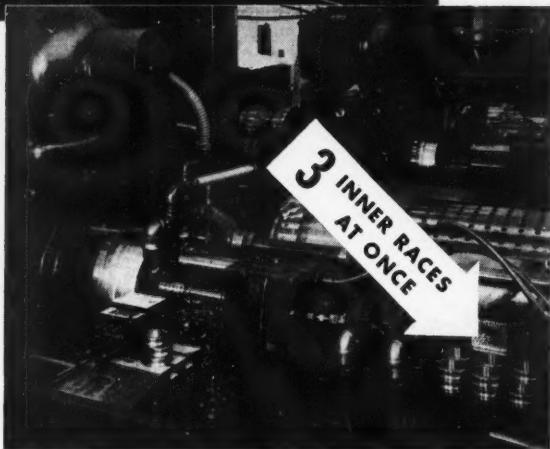


## with **CLEVELAND Automatics**

The road to economy in these two set-ups for production of high quality bearing components on Cleveland Model B  $3\frac{1}{4}$ " automatics is through multiple deliveries per cycle. The outer race blanks, 3.558" in diameter, are produced six at a time from SAE 52100 cold drawn tubing.

Inner races (2.985" OD) are formed complete with radii and chamfered ends, and delivered three at a time in a fast cycle, also using tube stock. Just an example of the fact that low cost production with Cleverlands is not limited to fancy tooling jobs.

*Get a CLEVELAND production proposal on YOUR next job.*



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Rockford Machine Tool Co.

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for the production engineer . . . or the company executive who selects and buys machine tools.



for the plant superintendent . . . or the shop executive responsible for machine tool selection and performance

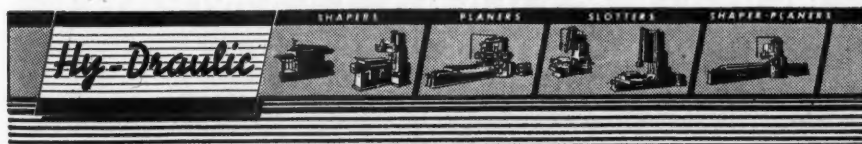


**if you want the facts . . . write for this new catalog**

Every essential fact about design, application, and performance is condensed in this new 32 page catalog . . . the complete up-to-date story about Rockford Hy-Draulic Shapers, Planers, Slotters, and Shaper-Planers.

Write for your copy . . . see for yourself the many advantages modern Rockford Hy-Draulic machine tools provide.

**ROCKFORD MACHINE TOOL CO.**  
ROCKFORD ILLINOIS





*Faster  
Smoother  
Cleaner*  
**GRINDING**



**WITH**

**ECONOMY**  
  
**LUBRICANT 1888**

- This easy-to-mix liquid type, water soluble lubricant for grinding and cutting keeps machines clean, wheels open and free cutting—less wheel dressing is required—production is increased.

ECONOMY LUBRICANT 1888 permits the use of finer grit wheels. It gives faster grinding, longer wheel life, cleaner stock removal and better finish.

WHITE & BAGLEY has specialized in grinding and cutting lubricants for more than forty years. To you this means superior products which will give you finer work—better production. The Economy line includes liquid and paste form Grinding Lubricants, Grinding Oils and Sulphurized Bases.

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**THE WHITE & BAGLEY COMPANY**  
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*Original Producers of Grinding Lubricant*





## CUTS DRILLING COST 20%

**T**HIS machinery manufacturer was using slow-speed, 15-lb. piston type tools to drill  $\frac{1}{4}$ " to  $\frac{1}{2}$ " holes. The Rotor Application Engineer recommended 1000 R.P.M., 9-lb. Rotor Air Drills. Results:

**Saves 20%.** Faster, easier drilling increased production 25% . . . cut costs 20%.

**Reduces Maintenance.** Rotor Air Drills cut upkeep

to fraction of former cost. No pistons, toggles, etc. to wear.

**Cuts Fatigue.** Drilling and reaming in all positions simplified by saving of 6 lbs. in weight of tool.

Try the Rotor Application Engineer's diagnosis for your cost ills.

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THE ROTOR TOOL CO.

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HIGH  
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# CHECK YOUR LATHE REQUIREMENTS AGAINST *Atlas* SPECIFICATIONS



If your face plate work comes within a 10 1/4" swing, and the rest within 6 1/2" and 36" in length, you can save money and time—in tool room, research, maintenance, and production—with Atlas 10" lathes.

The Atlas lathe is fully precision built for close tolerance work. It is compact—saves floor space. It is easier to set-up than large lathes—performs all standard operations. And reasonably priced attachments are available for special jobs. It takes but a 1/3 or 1/2 HP, 1725 RPM motor.

The probabilities are that many of your small parts operations can be handled by Atlas lathes to allow better use of your larger machines. Check the condensed specifications and performance features with that in mind. Your Atlas distributor will gladly provide complete details, or a letter will bring you the latest catalog.

## ATLAS PRESS COMPANY

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### 4 *Atlas* TOOL TEAM FOR SMALL-PARTS MACHINING

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LATHES

2.



MILLING MACHINES

3.



SHAPERS

4.



DRILL PRESSES

# GRAND RAPIDS GRINDING MACHINES



Grand Rapids Combination  
Tap & Drill Grinder No. 10-B

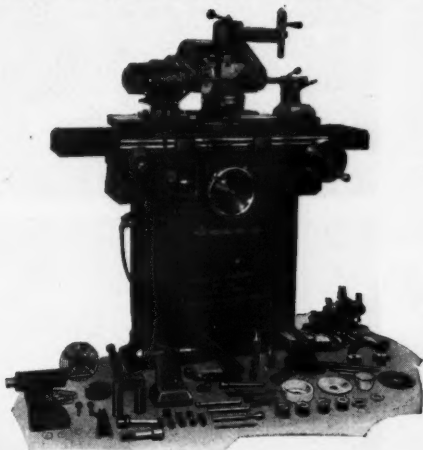
## DELIVER TOP TOOL ROOM EFFICIENCY

Whether you need a Universal Cutter and Tool Grinder or a Combination Tap and Drill Grinder, you can be sure of top tool room efficiency if they bear the name "Grand Rapids," manufactured by Gallmeyer & Livingston Co.

With the Combination Tap and Drill Grinder you have three ways: 1. On first cost, 2. Through lower maintenance expense, 3. On valuable floor space.

With Grand Rapids No. 60 Universal Cutter and Tool Grinder you can handle complex tool grinding jobs with maximum speed and convenience.

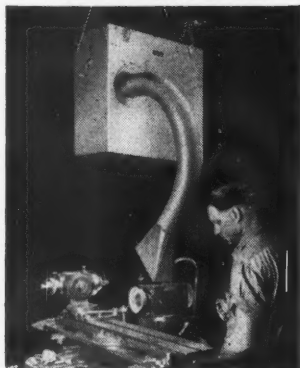
Write for descriptive bulletins  
GL 8-46 describes the No. 10-B  
2-28-46 describes the No. 60



Grand Rapids No. 60 Universal  
Cutter and Tool Grinder

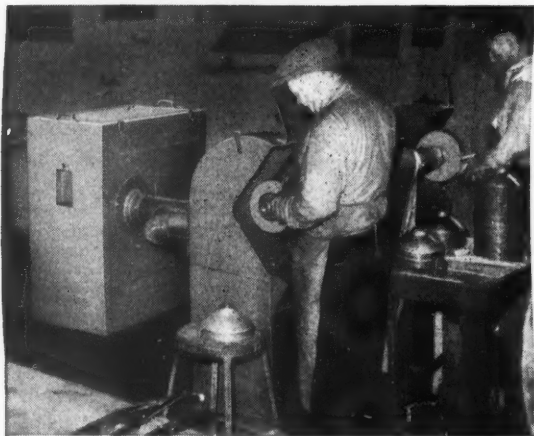
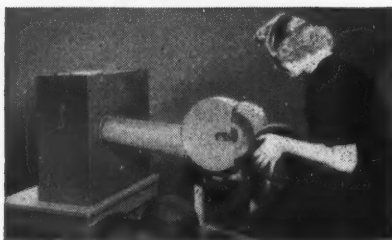
**What "GRAND RAPIDS" Quality Means:** Gallmeyer & Livingston cast their close-grained gray iron, machine to micrometric tolerances, precision-assemble grinding machinery of unsurpassed performance. *Grand Rapids* means top quality in grinding machinery.  
**GALLMEYER & LIVINGSTON COMPANY, 308 STRAIGHT ST., S. W., GRAND RAPIDS 4, MICH.**

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## *With Low Cost Individual* **DUSTKOPS**

All types of dusts are stopped by Dustkops: Dusts from Grinders, Polishers, Buffers, Sanders (belt and disc), Abrasive Cut-offs; Woodworking Equipment; Fumes from Degreasers; Vapor from Screw Machines and Thread Grinders all can be stopped with least cost by DUSTKOPS.



*Send for 16-page catalog  
and recommendations for  
your dust problem.*

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Service-Proved* 1917

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THE PERFORMANCE OF

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multi-Purpose  
**SHAPERS**

They're **FIRST** for PRECISION...  
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PRODUCTION COSTS...

All three models of GEMCO Multi-Purpose Shapers...Plain, Production, and Universal types...incorporate important features in design that have been proved by 30 years of research, proved by actual tests in countless machine shops or suggested by operators from all parts of the country. These superiorities, resulting from the composite thinking of men who know, make GEMCO Shapers first for high performance, wide adaptability, maximum economy and lower production costs...and increased profits. Featuring in addition, GEMCO'S own exclusive LUBRIGARD, the safety device that prevents damage to the machine through any failure in the lubricating system, GEMCO Shapers give longer, trouble-free service. Complete and detailed description of the features found only in GEMCO Shapers are set forth in the Bulletins that are free to you for the asking.

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**GENERAL ENGINEERING & MFG. CO.**

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# MARK IT for MARKET



Modern Marking Machines now enable most manufacturers of metal components to identify their products at trifling cost.

**TRADE MARKS—  
MANUFACTURER  
PART NUMBERS  
PERMANENTLY ROLLED  
ON YOUR PRODUCTS  
will help you market  
them.**

Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

*Illustrated at the left is  
Model 135 Production  
Marking Machine.*

**Write for Catalogue**

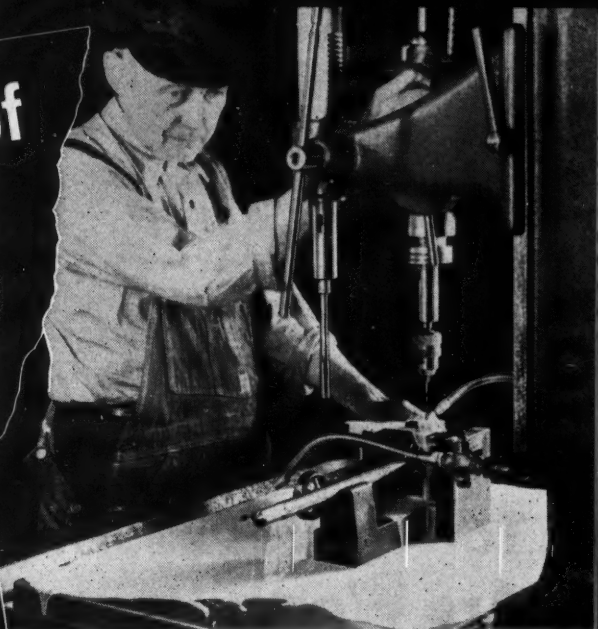


**GEO. T. SCHMIDT, INC.**

**1806 W. BELLE PLAINE AVE.  
CHICAGO • 13 • ILLINOIS**



For all types of  
**DRILLING  
REAMING  
TAPPING**

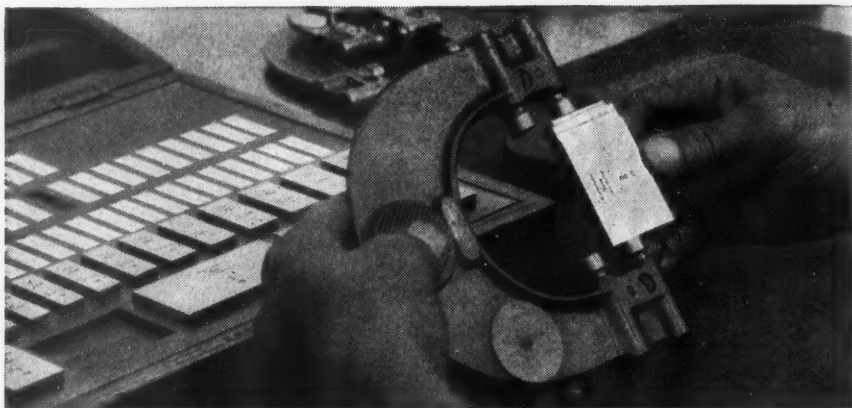


● Footburt Sensitive Drilling Machines have a wide range of speeds to be used in handling all sizes of tools within the rated drilling capacity of  $\frac{3}{8}$ " in mild steel or  $\frac{1}{2}$ " in cast iron. Standard speeds are 570 to 2300 RPM with 1200 RPM motor or 855 to 3350 RPM with 1800 RPM motor. The back gear attachment provides four additional slow speeds with a minimum of 185 RPM using the 1200 RPM motor or 277 using the 1800 RPM motor. Power feed and tapping attachments are available on any spindle to make production work easier and faster. Sturdy construction insures the maintenance of accuracy over many years of use.

**THE FOOTE-BURT CO., Cleveland 8, Ohio**  
Detroit Office: General Motors Building

**FOOTBURT**

*Sensitive*  
**DRILLING MACHINES**




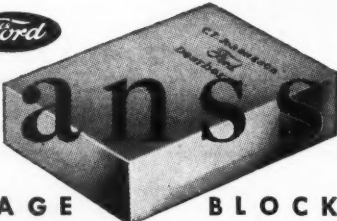
## Tolerances Worth Maintaining Are Worth Jo-Block Protection

When you set up dimensional inspection tolerances, it's to insure a specified class of fit in assembly, or to make sure of parts-interchangeability, or for some other good reason. The harder it is for an inspector to be *sure* he's staying within limits, *the more it costs*.

So, why not put a set of Ford Jo-Blocks on guard? Make it part of somebody's routine to check every working gage—whether snap-gage, micrometer caliper, dial indicator, plug-gage, ring-gage, or any other dimensional test device—with genuine Ford Jo-Blocks at definite, frequent intervals. Then, you'll *know* that everybody concerned is “speaking the same language” of measurement. Chances are that inspection will speed up and rejections at final inspection will be fewer.

Jo-Blocks are not expensive. They're made to three warranted accuracy standards—plus or minus .000002", .000004" and .000008". Sold throughout the Americas as single blocks or in varied sets (metric measurement, too). Extremely useful accessories available to expand and facilitate the use of Jo-Blocks. Write for illustrated literature. *Address:*

**FORD MOTOR COMPANY • JOHANSSON DIVISION**  
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**Johansson**  
  
**GAGE BLOCKS**

# The *Air Valve* You Have Been Looking For

## PILOT OPERATED • SOLENOID CONTROLLED

### A New ROSS Piston Poppet Type Valve

✓ **FAST OPERATING**  
as high as 400 cycles per minute.

✓ **LARGE ORIFICE AREA**  
results in fast exhaust, minimum restriction to air flow.

✓ **POSITIVE SEAL**  
by line pressure.

✓ **SIMPLICITY OF DESIGN**  
removing end plugs permits replacement of piston poppet assembly—no need to disturb piping or to move valve from position—no "down time".

✓ **ECONOMICAL TO OPERATE**  
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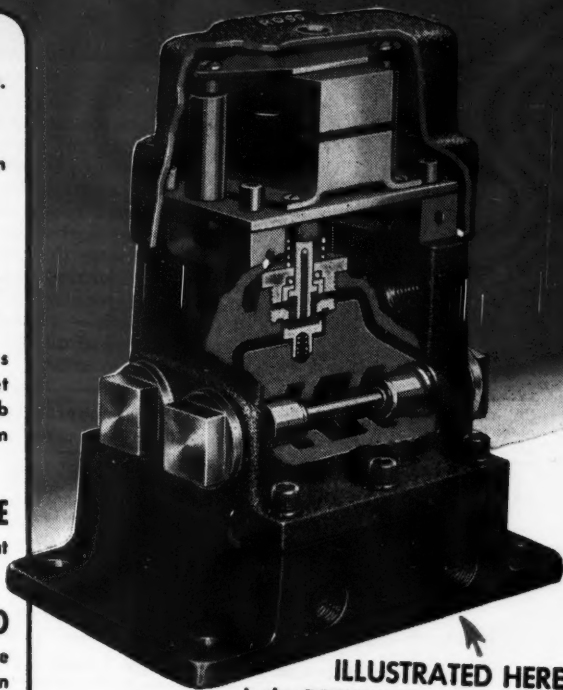
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many Ross valves installed more than 20 years ago are still in active service.

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appreciated where space is limited.

✓ **ALL PARTS**  
non-corrosive metals.

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and all parts interchangeable.

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FOR EVERY PURPOSE  
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*Available in:-*

- **THREE-WAY**  
normally open, or normally closed
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- **FOUR-WAY, Five port.**  
may be had in  $\frac{1}{4}$ ",  $\frac{3}{8}$ ",  $\frac{1}{2}$ " and  $\frac{3}{4}$ " pipe size

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*Air Control*  
**VALVES**



THE BRIDLE FOR AIR HORSEPOWER

**ROSS Operating VALVE CO.**

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# NO CHIP INTERFERENCE

Model 6-S



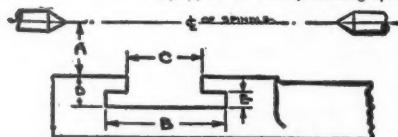
## with *Enco* MULTIPLE Tool Holders

The built-in accuracy of Enco Toolpost Turrets is constantly safeguarded. On larger turrets and all heavy duty models, which require extra protection, chip interference is avoided. Compensating spring makes indexing easier and keeps clamping lever and tool block in contact while block is indexed. Chips cannot enter the indexing mechanism . . . *precise indexing is assured.* Piece after piece can be produced with full precision required by the job—without switching tools. Enco's hardened all-steel construction protects original accuracy.

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"A" dimension range (From diagram here)	MODEL 6-S* 1 1/2 to 2 3/8" incl.	MODEL 4 1/2-S* 1 1/8 to 2 1/2" incl.	MODEL 3 1/2-S 1 1/8 to 1 3/4" incl.	MODEL 2 1/2-S 3/8 to 1 1/8" incl.	MODEL H 3/8 to 1 1/8" incl.
LATHE SWING	14" to 20" swing	13" to 16" swing	10" to 13" SWING AND BENCH LATHES	BENCH LATHES	BENCH LATHES
TOOL SIZE RANGE	5/8 to 1 1/4" or No. 2 toolholder for 3/8" square bit—	3/8" to 3/4" swing	1/4" to 1/2"	1/4" to 3/8" incl.	1/4" to 3/8" incl.
SPECIFICATIONS	4 tool, 12 positions 6" square	4 tool, 12 positions 4 1/2" square	4 tool, 12 positions 3 1/2" square	4 tool, 12 positions 2 1/2" square	6 tool, 12 positions 2 1/4" hex.
	PRICE \$99.00	PRICE \$49.50	PRICE \$35.00	PRICE \$23.00	PRICE \$25.00

\*Equipped with compensating spring—not required on smaller turrets.



Make of Lathe and Size	A	B	C	D	E	Maximum tool size desired

Write for "30 MODELS" catalog.

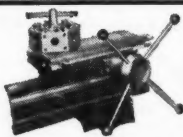
Prompt delivery can be made on all Enco Lathe Turrets. When ordering, give all dimensions and tool sizes.

Get the facts

on *Enco*

**HEXTURRETS**

the better bed turret



## ENCO MANUFACTURING COMPANY

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Republic Drill & Tool Company reduced sharpening cost to \$ .07 per milling cutter with bench-mounted Dumores, including all depreciation, maintenance and interest charges. ✽

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Dumore at the Hanna Stoker Company grinds I.D. of transmission-fork bushings  $3\frac{1}{2}$  times faster than former method, and saves 75% of the previous labor cost. ✽

## Cost Accountants favor Dumores—

and so do production, toolroom, and maintenance men who know how Dumores cut costs in all types of grinding . . .

If you want to cut your grinding costs, you can profit by the experience of scores of other companies. Versatile Dumore Grinders have established a new high in dependability — and a new low in costs — for production, toolroom, and maintenance work. They do all five types of grinding: external and internal cylindrical, surface, tool, and thread grinding.

A Dumore often enables you to avoid an investment in expensive special grinders —

- by converting basic machine tools — equipment you now have — into precision grinders.

- by combining with used machine-tool bases to provide inexpensive, dependable production grinders.
- by serving as variable-speed, precision work-heads for special machines or set-ups of your own design.
- by operating bench-mounted for off-hand or jig-and-fixture work.

Send in the coupon below, for your free copy of *Here's How*—a book packed with reports on Dumore's grinding economy in 76 different plants. It gives you one idea after another for cutting the costs for grinding in your own plant.

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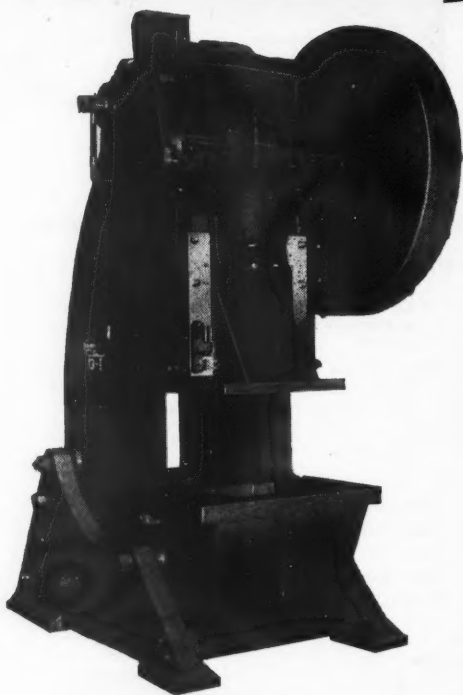
**DUMORE**  
PRECISION TOOLS

Sold by leading industrial distributors in all principal cities.



# CLEVELAND *Inclinable* PRESS

## 150 tons Capacity



This big ruggedly constructed, compactly designed, No. 13-I Cleveland Inclinable Press is arranged with an electrically controlled, air operated friction clutch and brake.

The Press, which exerts a pressure of 150 tons, has a stroke of 6 inches, adjustment 10 inches, bed area 30 inches x 45 inches and operates at 33 strokes per minute.

The Clutch, Flywheel, Brake and Motor are mounted between the uprights and the gears, which run in oil, are fully enclosed in oil tight guards.

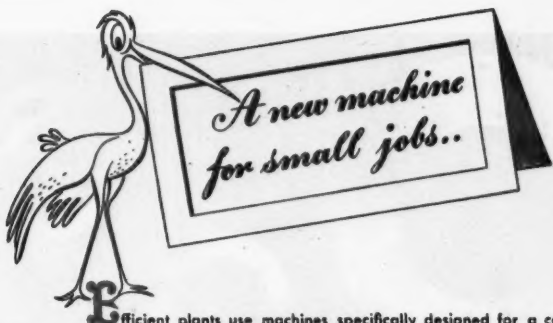
Other Presses of this series include

11-I, 110 tons; 10-I, 90 tons;  
9-I, 75 tons; 8-I, 60 tons and  
7-I, 45 tons.

If interested in Inclinable Presses, write for a copy of our Catalog

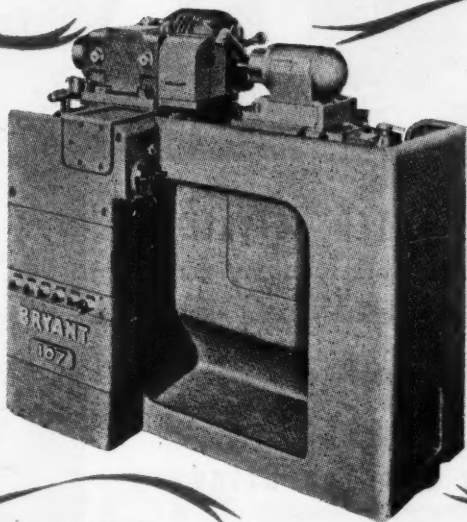
*The* CLEVELAND PUNCH & SHEAR WORKS COMPANY  
3912 St. Clair Avenue CLEVELAND 14, OHIO





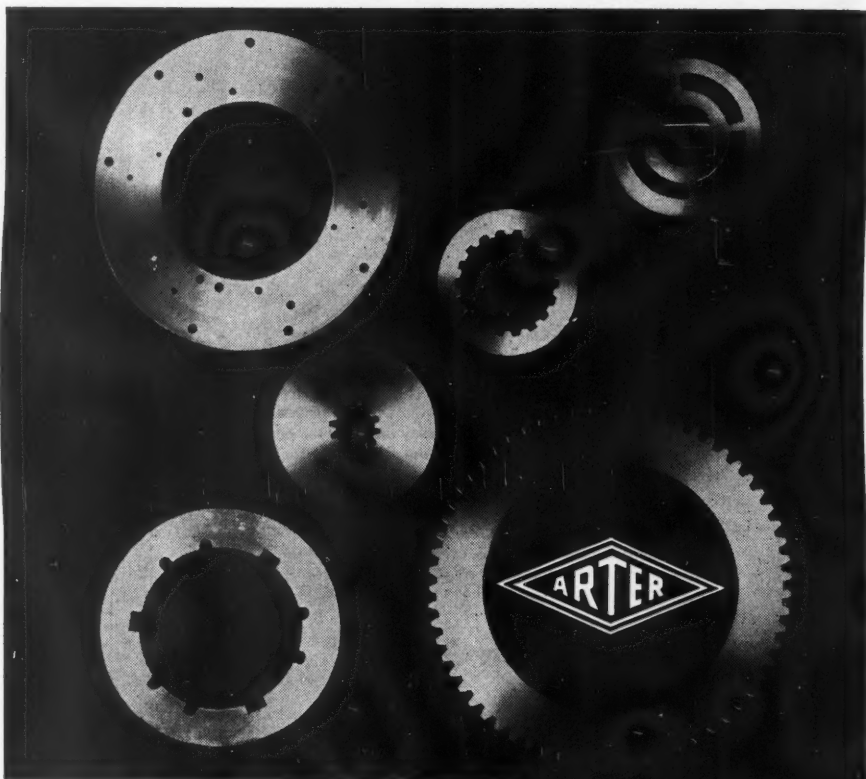
Efficient plants use machines specifically designed for a certain range of work sizes. For greatest efficiency in the grinding of small holes ( $\frac{1}{8}$ " to 3"), Bryant offers the new, small Series 107 Internal Grinder. ● The Series 107 is designed for tool room and small lot grinding. It has a chuck swing of 9 inches, a maximum traverse stroke of 6 inches and a maximum grinding stroke of 4 inches. Provision can be made for 11" swing. Preloaded ball bearings are used on both cross and longitudinal slides. This allows the use of a very light wheel slide, yet provides the utmost rigidity and sensitivity necessary for extremely precise work with quality finish. The new Series 107 uses the Bryant High Frequency Wheel Head as standard equipment. This provides direct wheel spindle drive at speeds up to 100,000 r.p.m., assuring the efficient surface speeds so necessary when grinding small bores. Belt drive is available for slow speeds. ● Although a minimum of floor space is required, operator comfort has been carefully considered. The simplified controls are conveniently located, and the operator may operate the machine, either when standing or sitting. Write for complete details on this new, small internal grinder that is functionally designed to grind small bores.

THE NEW BRYANT  
SERIES 107  
INTERNAL GRINDER  
FOR SMALL BORES



Send for the Man from  
**BRYANT CHUCKING GRINDER CO.**  
SPRINGFIELD, VERMONT, U. S. A.

**BRYANT** 



## Typical ARTER Versatility

Flat circular work requiring perfect parallelism . . . extreme flatness . . . exact thickness . . . with a particular degree of finish required. All easily obtained on

**ARTER**  
Rotary Surface Grinders



**ARTER GRINDING MACHINE CO.**  
WORCESTER, MASSACHUSETTS • U. S. A.

# SHARP CUTTERS

## Boost Production

The "ACE" Tool and Cutter Grinder has proven its worth in toolrooms around the world —GETS MORE PRODUCTION —Cutters stay sharper longer . . . less down time for changes . . . MORE ECONOMICAL — The average life of a cutter is longer . . . fewer replacements. MORE ACCURATE — Cutters sharpened on the "ACE" have all teeth uniformly ground and all teeth cutting.

Use The "ACE" to keep reamers, end mills, side mills, spot facers and all kinds of special tools and cutters in like new condition. (2 models).



OLIVER  
of  
ADRIAN  
PRODUCTS

IMPROVE YOUR TOOLROOM  
IT'S THE BACKBONE  
OF PRODUCTION

**OLIVER**  
OF ADRIAN

**OLIVER INSTRUMENT CO.**

1430 E. MAUMEE ST.

ADRIAN, MICH.

Send For New Illustrated Catalogue

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES



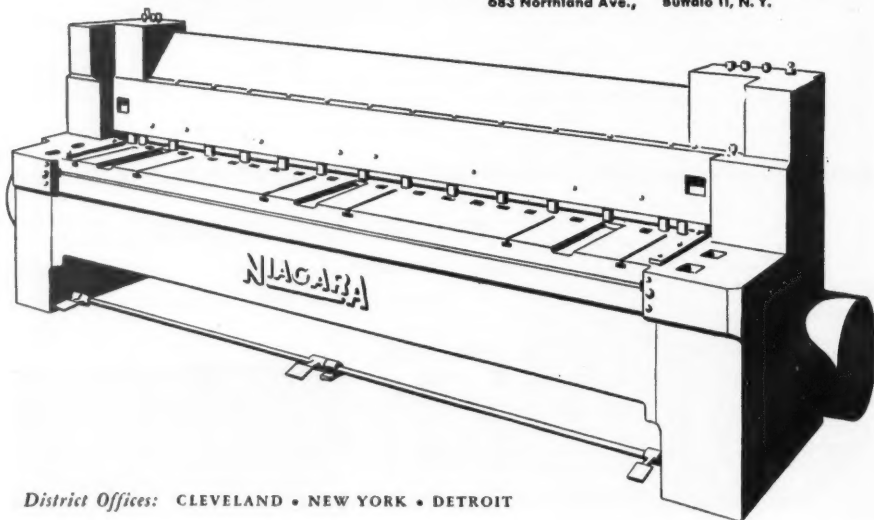
Charles M. Schwab

## Great Names in America's Progress

● The business of the Niagara Machine and Tool Works was built on a foundation of steel. One of the distinguished builders of the steel industry was Charles M. Schwab,—a great name in steel. The expression "Made in U. S. A." could well be amplified to say "MADE OF STEEL IN U. S. A." Countless products contributing to better living of men, women and children everywhere are made possible...made better...made more economically by being made of sheet steel on Niagara Presses and Shears. Men responsible for production are invited to learn about the design and performance of Niagara machines.

**NIAGARA**  
MACHINE AND TOOL WORKS

683 Northland Ave., Buffalo 11, N. Y.



District Offices: CLEVELAND • NEW YORK • DETROIT

IT'S ALIVE

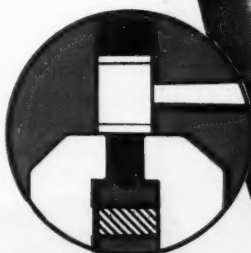
*Nuplaxflex*

**for NUPLA HAMMERS**  
**The Modern Tools**

Attention craftsmen! Now you can use the Nupla soft-face hammers to do all jobs — and do them better than with odd assortments of old-style hammers. Made with Nuplaxflex tips, they save you time and money because they can do any suited job — faster and easier.

Nuplaxflex, a time-tested material developed by New Plastic Corporation, gives these hammers added toughness, resiliency, and self-healing qualities no others possess. Now, more than ever, they are mar-proof hard hitters . . . far more durable than rawhide because they will not mushroom or permanently deform . . . and unlike rubber, they have no rebound . . . no sting; unaffected by gasoline or oil. They are safe, too — no fire or explosion hazard. Available in standard sizes and weights, with three tip grades: soft, medium, and tough.

When you buy a soft-face hammer, look for the Nuplaxflex tip!



**CRUSH IT IN A VISE.  
IT HEALS ITSELF!**

**NEW PLASTIC CORPORATION**

1017 NORTH SYCAMORE AVE. • LOS ANGELES 38, CALIFORNIA

Ask your supplier, or write for information Dept. B-4

if it takes you more than

28 minutes to pierce this one panel...

then you'd better get a **WIEDEMANN**



The same short run piercing job took 28 minutes on a Wiedemann R-4P because layout time was completely eliminated. There was no waiting for the die set-up man . . . all punches and dies were carried in the turret of the machine right at the operator's fingertips.

There's a Wiedemann Turret Punch Press that can save you both time and money on every short run piercing operation . . . chassis, instrument panels, electrical boxes, bus bars, sheet metal parts, and plate up to  $\frac{3}{8}$ " in thickness.

Get the facts today. Send for the story of short run piercing economy . . . Bulletin 92.

**WIEDEMANN MACHINE CO.**  
1821 SEDGLEY AVE. • PHILADELPHIA 32, PA.

**HERE'S THE ACTUAL JOB!**

Check these production times . . . typical work of the R-4P.

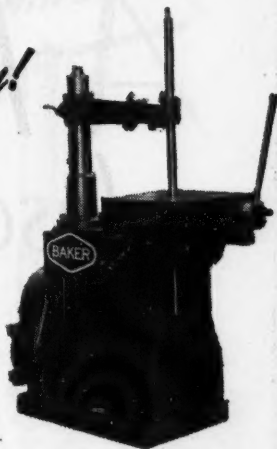
- \* 42 strokes required to complete job
- \* 8 different dies required - R-4P Pin Type Gauge
- \* Total time to produce first piece . . . 28 minutes
- \* Time for every subsequent piece . . . 9 mins.



# BAKER KEYSEATER

*for Speed and Accuracy!*

Baker Model 0 Keyseater meets demands for speed, accuracy and alignment in the finished keyseat. Soundly designed...sturdily built for trouble-free, long-life performance. Operated on the draw cut principle: equipped with a push-button controlled, non-reversing type, 2 HP, 1200 RPM motor, mounted on a pivoted base; crank action adjustable for setting stroke from 0 to 9". Capacity ample to cut keyways in mild steel up to 9" long by 1" wide at a feed of .005". Write for bulletin.



# BAKER JACKS

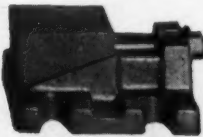
*for Easy Leveling!*

Baker Jacks solve the problem of keeping equipment level and in alignment—for maintaining highest efficiency of machine tools. These jacks are positive in action yet readily adjustable. Machines mounted on them can be checked frequently and corrected at little expense. Leveling time is negligible and the equipment is held firmly in place. Thoroughly tested... offered in three sizes. Write for more details.



No. 41

*For lathes, milling machines, etc.*



No. 42

*For small planers, boring mills, etc.*



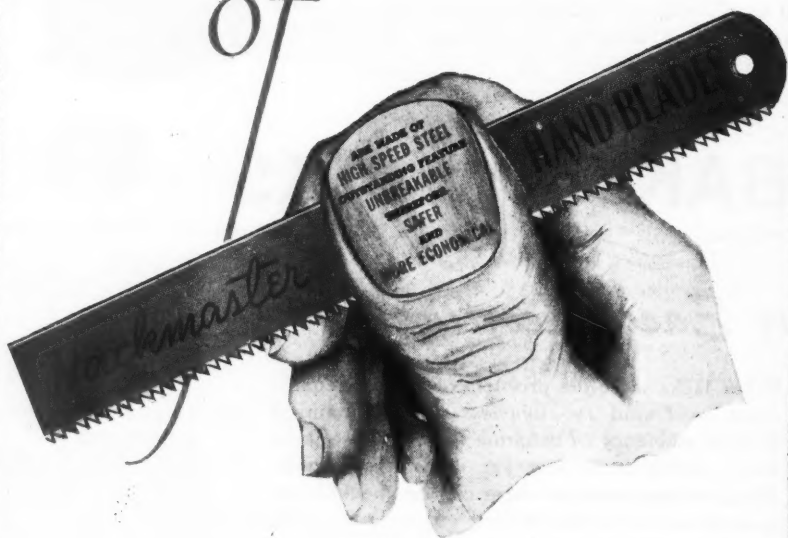
No. 43

*For large boring mills, planers, etc.*

**BAKER BROTHERS, Inc., Toledo, Ohio**

DRILLING, TAPPING, KEYSEATING and CONTOUR GRINDING MACHINES

# A Thumbnail description of



SOLD THROUGH DISTRIBUTORS

**AMERICAN SAW & MFG. CO. SPRINGFIELD, MASS.**  
HACK SAWS · BAND SAWS · GROUND FLAT STOCK · TOOL BITS

*For* **FASTER**  
PRECISION HONING....

# FULMER HONING MACHINE

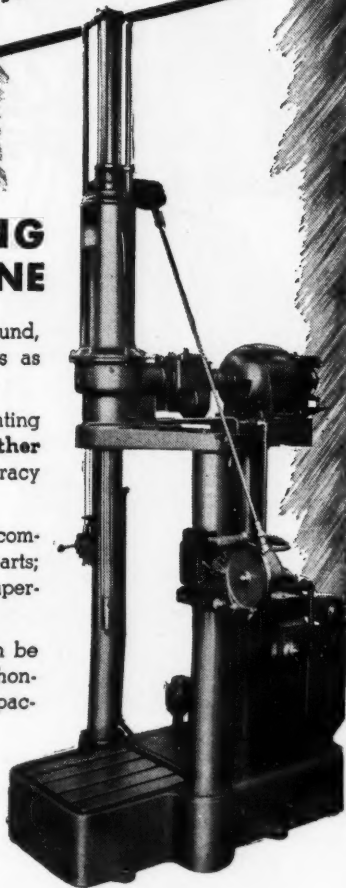
**T**HE Fulmer Honing Machine produces round, straight, smooth bores to working tolerances as close as  $\pm .0001''$ .

Due to a wide range of spindle and reciprocating speeds, it **removes material faster than any other known method** for a comparable degree of accuracy and surface finish.

It is ideal for finishing aircraft, Diesel, gas and compressor cylinders; connecting rods; supercharger parts; landing gear struts; recoil cylinders—wherever superfine surfaces and extreme accuracy are required.

Cylinders of either small or large diameter can be honed on the Fulmer Honing Machine. Standard honing capacity is up to 20" inside diameter. Larger capacity on special order. Maximum stroke 72". Any conventional honing heads can be used. Write for complete information.

**C. ALLEN FULMER COMPANY**  
1233 First National Bank Bldg., Cincinnati, Ohio



**FULMER**  
**PRECISION PRODUCTION EQUIPMENT**

ROD BORERS  
HONING MACHINES  
PISTON RING LAPPERS  
CENTRIFUGAL CASTING MACHINES

**DEALERS:** A few attractive territories remain open. Write today!

# **UP YOUR PRODUCTION DOWN YOUR COSTS**

## **ON YOUR PRESENT EQUIPMENT**



Our plant is fully equipped to help you solve your **RETOOLING** problems for **HIGH** production and low cost per piece.

**TYPICAL, RETOOL DESIGNED AND BUILT BY BUHR, IS THIS STANDARD DRILL PRESS WITH A COMPLETE TOOLING CONSISTING OF . . .**

**4-Spindle Engineered by Buhr drill and ream head with vertical adjustment in spindles bushing plate. 3-Place holding fixture mounted on 14" hand index table for drilling and reaming 2 holes in connecting rod cap.**

**GEARS IN BUHR DRILL HEADS ARE SPLINED, SHAVED AND INDUCTION HARDENED FOR QUIETER OPERATION, BALL BEARINGS FOR LONGER LIFE AND MORE TROUBLE-FREE PRODUCTION HOURS.**

***Write us about your problems or send blue prints to us . . . we will give you our recommendations***

# **BUHR**

**Machine Tool Co.**  
**845 GREEN ST.**  
**ANN ARBOR, MICH.**

# PRECISION TOOL ROOM GRINDING

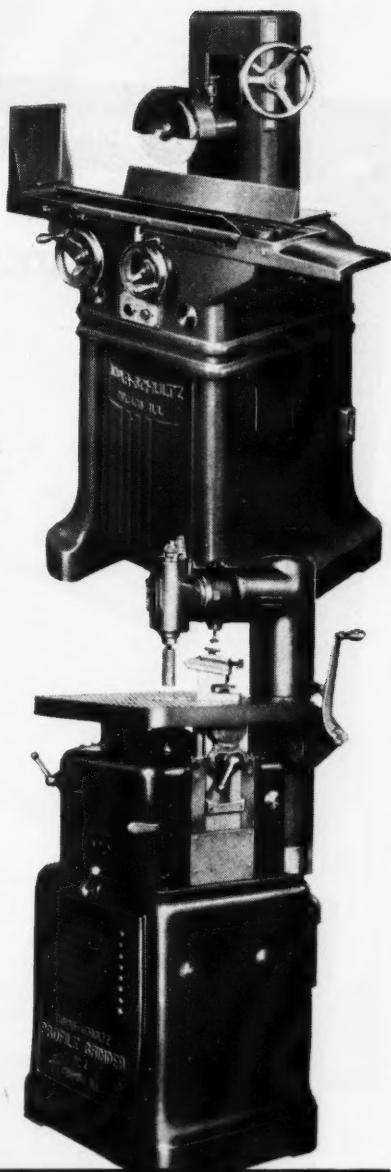
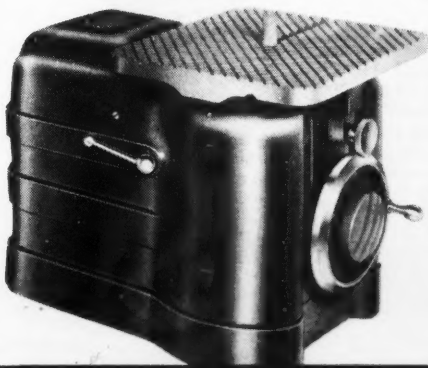
Designed for the Tool Room and Die Shop where precision workmanship is all important . . . Built with Boyar-Schultz quality, resulting in sturdiness that HOLDS accuracy, not only in tool and die work, but in production wherever accuracy is necessary.

**No. 618 SURFACE GRINDER** A sturdy, easy operating Surface Grinder, designed for the Tool Room and built to give positive precision performance over long periods of time.

**No. 2 PROFILE GRINDER** A larger, heavier Profile Grinder with two independently powered spindles, operating at 10,000 R. P. M. with vertical oscillations.

**No. 1 PROFILE GRINDER** A bench size Profile Grinder. A time saver in grinding dies, punches, cams and templates. Operates at 20,000 R. P. M. A rapid stock remover.

WRITE FOR CIRCULARS



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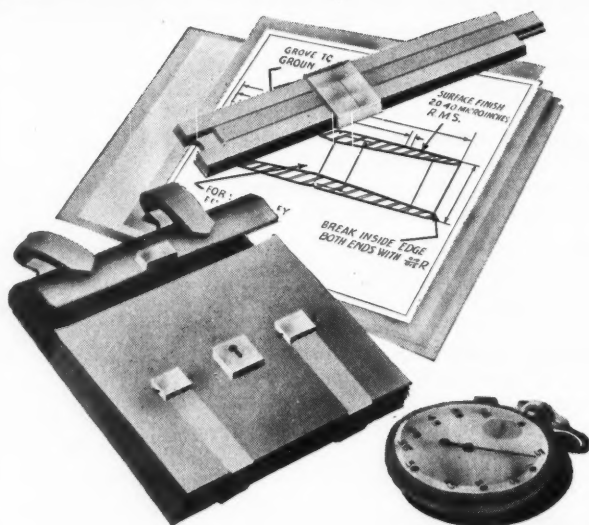
## BOYAR-SCHULTZ CORPORATION

2120 Walnut Street, Chicago 12, Illinois

## A BUYING GUIDE FOR ABRASIVES

Point No. 3

### ABRASIVE ENGINEERING



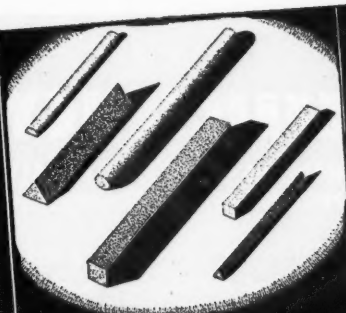
For an increasing number of abrasive users, the suggestion to "Call in CARBORUNDUM" is becoming a standard practice. In many cases, it means calling in our Abrasive Engineers to discuss specific abrasive applications.

Here is a group of specialists well qualified to step in where there are unusual or difficult problems involving grinding, sanding or finishing. Often the information they pass on to both operators and production management is especially helpful... a fact reflected in the preference of so many plants for abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

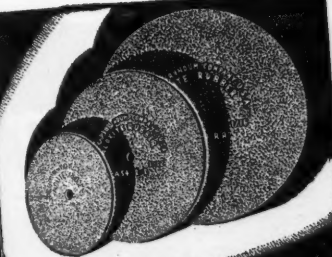


A Good Rule for Good Grinding

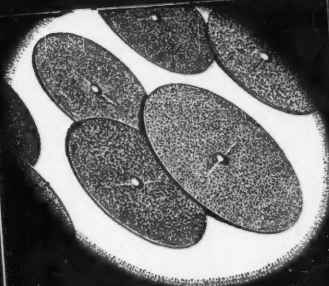




Tool Room sticks and stones that cut fast... last long... and hold their form.



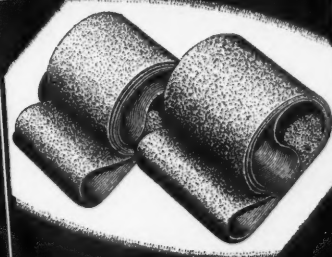
Cutting-Off Wheels... the modern tool for faster, less costly, more finished cuts.



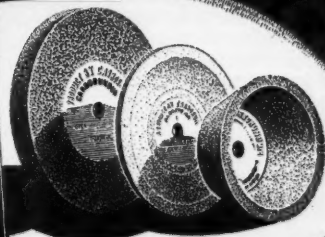
Long lasting Discs for both flat and curved surfaces.



Mounted wheels, in all standard grits and grades, for portable grinding equipment.



A Coated Abrasive for every sanding and finishing condition.



All standard shapes are supplied in grinding wheels by CARBORUNDUM.

... CALL IN

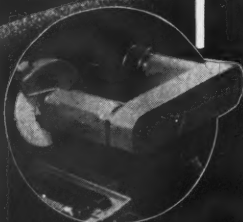
# CARBORUNDUM

TRADE MARK

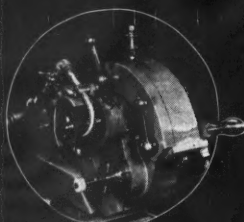
• BONDED ABRASIVES • COATED ABRASIVES • ABRASIVE GRAINS AND COMPOUNDS

# Designed for **EFFICIENCY**

TO PRODUCE MORE OF A GREATER VARIETY  
THRU EASE OF PRECISION SET UP AND OPERATION



External Bracket



Internal, External Turret

## RANGE

Internal spindles of suitable design and speed may be selected for hole grinding up to approximately 3" diameter and 4" length.

External bracket with 7" x 1/2" wheel may be used for on-center or chucked work up to approximately 3" diameter.

Turret for concentric grinding of hole or outside surface is limited to such work as may be chucked.

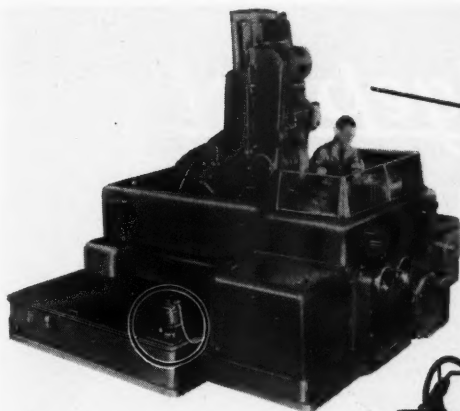


# RIVETT

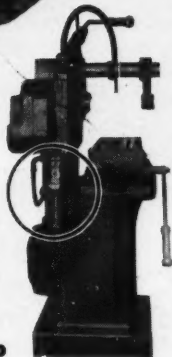
**RIVETT LATHE & GRINDER, Inc.**

BRIGHTON • BOSTON • MASS. • U. S. A.

Write for Bulletin 104.



Pratt & Whitney 26" Gear Grinder in operation. Equipped with 1/2 H.P. Model HL-2 Gusher Coolant Pump.



Kent-Owens No. 2-20 Hydraulic Milling Machine, equipped with 1/10 H.P. Model 2-P3-Short Gusher Coolant Pump.

There's a . . .

## **RUTHMAN GUSHER COOLANT PUMP**

for every metal cutting operation

Whatever the size of your metal working equipment or the capacity of coolant flow required, there is a Gusher Coolant Pump for your exact needs. Manufactured in from 1/10 to 2 H.P. motor size with a capacity of up to 209 gallons-per-minute, Gusher Coolant Pumps are famous throughout the machine tool industry for their simple sturdy construction and dependable performance.

Your coolant system worries are over when a Ruthman Gusher Coolant Pump is installed on your machine.

WRITE FOR CATALOG 10-F

# **THE RUTHMAN MACHINERY CO.**



1817 READING ROAD

CINCINNATI 2, OHIO

Photos Courtesy

Pratt & Whitney  
West Hartford, Conn.  
Kent-Owens Machine Co.  
Toledo, Ohio

MODEL  
TL



April, 1947

MODERN MACHINE SHOP 71

# Bridgeport

## TURRET MILLING MACHINE

THE BRIDGEPORT TURRET MILLING MACHINE has won universal acceptance. It has proved a most valuable time and labor saver in the tool rooms and production departments of the largest plants. Its wide range and versatility in milling, drilling, boring and shaping enable it to serve as the complete central machine around which all operations revolve in many small shops.

It will pay you to explore the possibilities of the "BRIDGEPORT" in your plant.



BRIDGEPORT MACHINES, INC.

82 RIVER ST.

BRIDGEPORT, CONN.

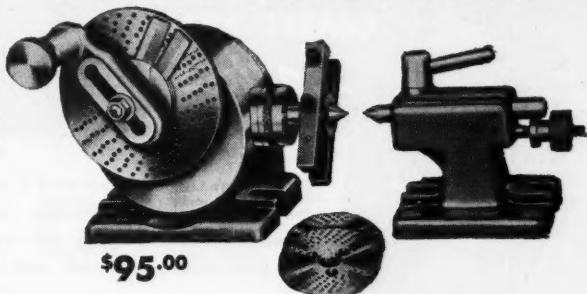
# L-W

## ANNOUNCING THE NEW L-W Model SD 6 1/2" UNIVERSAL DIVIDING HEAD

Well built for hard daily usage on smaller milling machines. Rugged head and tailstock.

Alloy steel spindle has a tapered bearing. Bored for No. 9 B & S taper threaded spindle nose. Head tilts to 90° in vertical position. Special alloy steel worm and bronze worm wheel cut to close limits for accuracy. End thrust is taken out by bronze bearings.

Complete with three index plates for dividing all numbers to 50, and even numbers to 100, with the exception of 96T. Index chart shows all divisions obtainable to 380.



**\$95.00**

## L. W. 11" UNIVERSAL DIVIDING HEADS

Headstock — Rugged. Rigid. Swivels to any angle.

Tailstock — Sturdy. With stands heavy cutting.

Headstock Spindle—Tapered bearings, bored for No. 10 B & S Taper. Increased diameter and length. Threaded spindle nose, 2 1/4" diameter 10 thread USS.

Worm — Special alloy steel, accurately finished, ball bearing end thrust. Easy, accurate, adjustment of worm wheel.

Worm Wheel—Large diameter, 40:1 ratio, accurately generated, securely mounted on spindle.

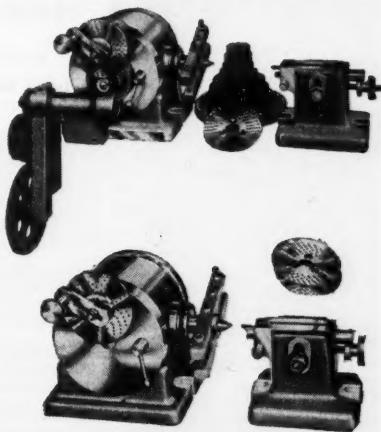
Equipment — 3/4" table slot tongues, three index plates, dividing all numbers to 50, and even numbers to 100, with the exception of 96T.

Index chart shows all divisions obtainable to 380. When ordering AU Heads specify either right or left hand model.

**Model AU**  
Fully  
Universal  
for Complete  
Indexing and  
Spiral Cutting

**\$219.15**

**Model BP**  
for PLAIN  
MILLING  
MACHINES  
**\$151.20**



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



# L-W CHUCK COMPANY

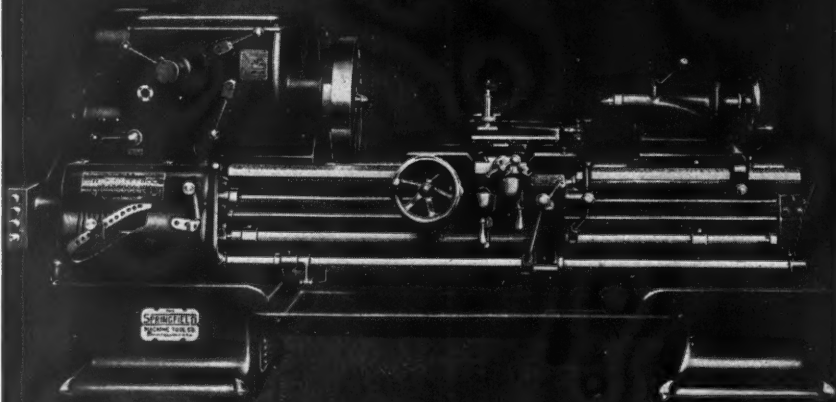
28 SO. ST. CLAIR ST.  
TOLEDO 4, OHIO

HEAVY DUTY  
*Springfield*  
GEARED HEAD  
*Lathes*

Tool Room Lathes have lead screw reversing mechanism which produces right and left hand threads and feeds with automatic stops for both lead screw and feed rod.

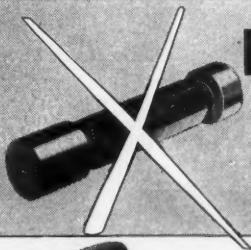
Deep, well ribbed lathe bed of high test nickel chrome gray iron assures extreme accuracy and long life.

Ground gears and up-to-date oiling systems on all sizes. Write for Bulletin 162.



**THE SPRINGFIELD MACHINE TOOL CO.**  
SPRINGFIELD • OHIO, U. S. A.





## DuBo Gages are going over!

Orders and re-orders demonstrate DuBo  
superiority over cylindrical plug gages



## \* DuBo Plug Gage

checks bores **FASTER,**  
**more accurately!**

Enthusiastic users all over the country are rapidly replacing cylindrical plug gages with DuBo Gages. The first use unmistakably demonstrates DuBo superiority — its extreme lightness, its ability to detect dimensional deviations (taper and out-of-roundness), its ease, speed and accuracy. STANDARD representatives in leading industrial centers will gladly arrange a demonstration for YOU.

WRITE FOR BULLETIN

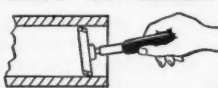
\* Patents Pending

### LIGHT IN WEIGHT



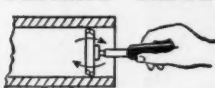
DuBo Gages weigh 70% to 80% less than cylindrical plug gages of equivalent size. Lighter weight means less fatigue, greater accuracy.

### EASY TO ENTER



DuBo is entered easily by tipping handle slightly above bore axis (no jockeying necessary). Enters even under-sized bores easily.

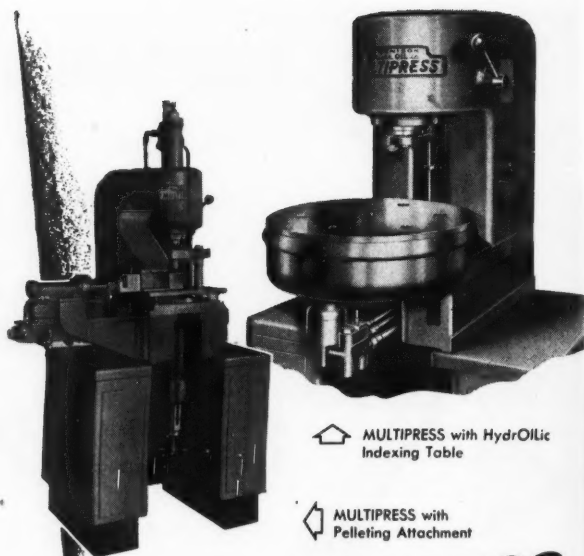
### DEFINITE CHECK





Enter gage, rock handle gently, bringing spherical gaging surface in contact with bore wall. Whether or not handle drops freely below center, is definite yes-or-no answer.

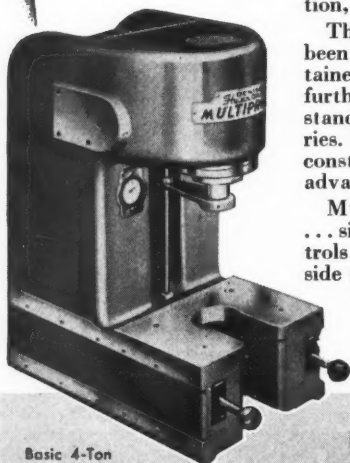
**STANDARD GAGE CO., INC., Poughkeepsie, N.Y.**

Blanking  
Forming  
Pelleting  
Shearing  
Marking  
Assembling



 MULTIPRESS with Hydroilic Indexing Table

 MULTIPRESS with Pelleting Attachment



Basic 4-Ton  
MULTIPRESS

**O**N SCORES of jobs like these—and many others—MULTIPRESS users continue to report higher production, increased efficiency and better results.

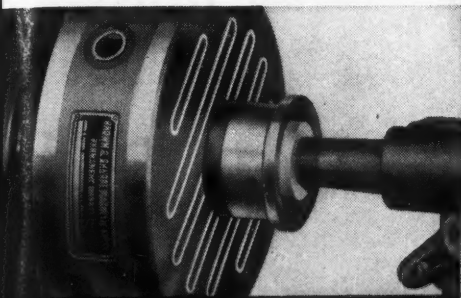
The reason: remarkable operating flexibility has been built into the highly compact, fully self-contained *basic* MULTIPRESS—and its flexibility has been further multiplied by an unusually wide range of standard MULTIPRESS controls, toolings and accessories. In addition, Denison research engineers work constantly to find better ways to apply MULTIPRESS advantages to specific operations of every kind.

MULTIPRESS offers a choice of 4, 6, or 8-ton units . . . six different models . . . manual or automatic controls . . . accessory benches, work-table extensions, side shelves and bolster plates . . . attachments for indexing, pelleting, foil marking, etc. . . toolings for almost any need. Write for full details. The Denison Engineering Company, 1153 Dublin Road, Columbus 16, Ohio.

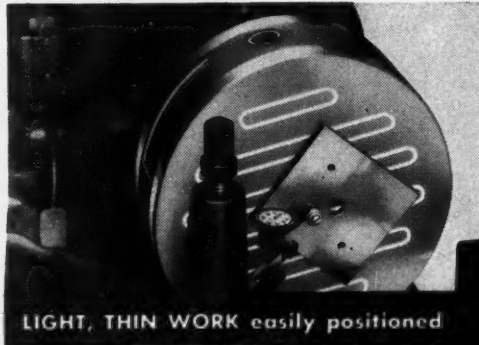


**DENISON**  
EQUIPMENT *for* APPLIED  
*Hydroilics*

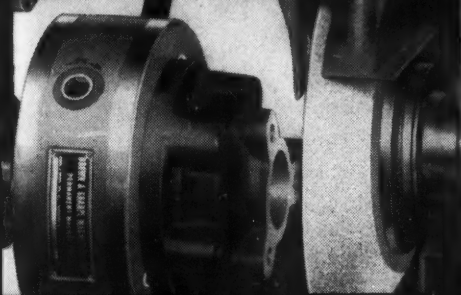
# ***FAST...SIMPLE** work holding* for GRINDER, LATHE or BENCH **ROTARY MODEL PERMANENT MAGNET CHUCK**



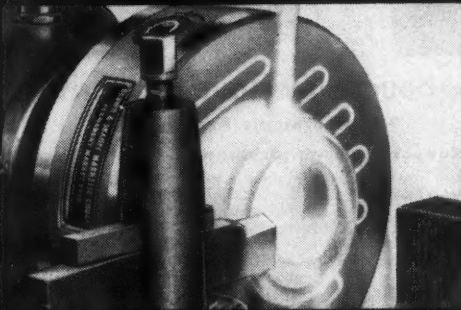
**INTERNAL GRINDING** simplified



**LIGHT, THIN WORK** easily positioned



**CYLINDRICAL, FACE or DISK GRINDING**



**LIGHT CUTS** on LATHES

● Illustrations show some of the many advantages of the **Rotary Model** (9" dia.) ... for grinding operations, light cuts on lathes and holding thin work for light machining. No electricity ... no wires ... no danger of work flying off ... no heating of work or chuck.

**Rectangular Models** (5 sizes from 27/16" x 5 1/4" to 12 1/8" x 36") and other Permanent Magnet Holding Tools also available.

*For sale only in the United States of America and its Territories. Write for catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.*



*We urge buying through the Distributor*

# **BROWN & SHARPE**

*The One  
Modern*  
**SHEARING  
PRESS**



# PRODUCTO

## Nº 2 UTILITY PRESS

**50 TON  
CAPACITY**

Just what  
its name  
implies...  
the modern,  
versatile Screw  
Press... for shearing,  
assembling and lining  
punches and dies... for  
separating large die sets... for short broaching operations,  
assembling or disassembling press fit components, bearings etc.  
Also as an arbor and straightening press. Low in cost. High  
in time and cost-saving value.

**PRODUCTO SERVICE  
IS ALWAYS AT THE  
PHONE ON YOUR DESK**



### THE PRODUCTO MACHINE COMPANY

960 Housatonic Ave.,

Bridgeport 1, Conn. Bridgeport 4-9481

NEW YORK 12,  
197 Lafayette St.  
Worth 4-7484

CLEVELAND 14,  
3200 Lakeside Ave.  
Express 1133

DETROIT 11,  
3017 Medbury  
Plaza 3101

INDIANAPOLIS 2,  
635 Fulton St.  
Lincoln 5385

LOS ANGELES 21,  
2168 E. Olympic Blvd.  
Trinity 9827

**MANUFACTURERS OF PRODUCTO DIE SETS**

*Do You  
Want to...*

- **REDUCE REJECTS TO NIL?**
- **INCREASE OUTPUT 10-1?**
- **ELIMINATE EXPENSIVE TOOLING?**
- 

*This IS THE MACHINE THAT CAN DO IT!*  
**PORTER-CABLE**  
*Wet-Belt Surfacers*

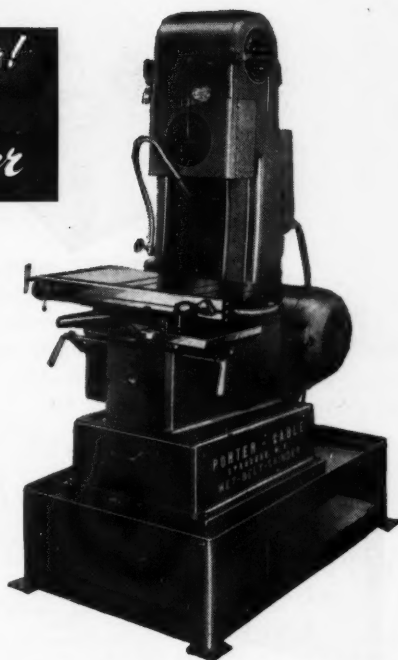
The proof is in performance! Here are some actual production records set by the PORTER-CABLE WET-BELT SURFACER:

➤ On one job, rejects which formerly ran 20% - 25% of production were reduced to only 2 in 18 months!

➤ On long aluminum castings, three bearing pads and three supports were each machined simultaneously . . . ten times faster than by previous methods!

➤ On work requiring limits of plus .001", minus nothing, the operator faced two parts before another man had finished locking one up in a jig for milling!

➤ You can equal or exceed these results, completing many precision operations freehand, doing others with only the simplest of fixtures. Jobs which you've been doing on millers and shapers can be done faster, better and cheaper by the PORTER-CABLE wet-belt method of machining. Set up these rapid machines on the production line, in assembly departments, tool room, maintenance or pattern shops . . . man them with unskilled operators . . . and watch them uncork bottlenecks! Send for the complete story of the PORTER-CABLE WET-BELT SURFACER.



➤ Write for complete production details and actual case histories of its use on many different machining jobs.

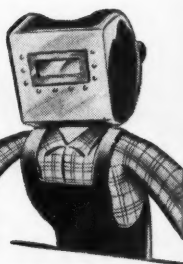
**PORTER-CABLE**  
**MACHINE COMPANY**

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Buy the  
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5 And 10 POUNDERS



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GAS WELDING - CUTTING EQUIPMENT  
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12 types of rod in one handy package. Contains the right rod for every welding job . . . each rod a leader in its class. Ideal for all machine shop jobs, the Marquette Weld-All Kit furnishes a practical supply of rods for fast, low cost repairing and hardsurfacing tools, dies, cutters, jigs, fixtures, etc. This generous supply of Marquette Electrodes is an actual \$21.90 value.

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BEARINGS**

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5 TON  
CAPACITY**



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**OVERSIZE  
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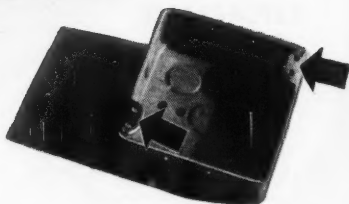
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**WRITE FOR  
FURTHER INFORMATION**



Photo courtesy of Appleton Electric Co., Chicago, Ill.

**TAPPING PRODUCTION  
JUMPS 200% WITH  
*Ettco-Emrick*  
MULTIPLE HEADS**



Here's another example of the big jumps in production that many manufacturers are getting with Ettco-Emrick Multiple Heads in small parts drilling and tapping.

This job is the tapping of the four No. 8-32 holes indicated by the arrows in the electrical outlet box shown above. This was formerly done by the single spindle method at the rate of 500 boxes an hour. Now, as you see in the picture at the left, it is done with an Ettco-Emrick Multiple Tapping Head and Fixture unit mounted on a foot-operated tapping machine—and the girl operator easily turns out 6,000 accurately tapped holes per hour. Production increases, such as this one of 200%, quickly pay back the comparatively low cost of the Multiple Head Units.

## FIND OUT WHAT ETTCO-EMRICK MULTIPLE HEADS WILL DO FOR YOU

If you do any small parts drilling or tapping it will pay you to find out about the Ettco-Emrick Multiple Head System.

**BULLETIN No. 31** gives full details and many examples. Write for a free copy today.



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*Over 25 years specialization in solving industries drilling and tapping problems*

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Standard shanks with Morse tapers carried in stock . . . send us your specifications and blueprints . . . we will see that your job is set up with the right LIVE CENTER.

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### BRIGHTBOY INDUSTRIAL DIVISION

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# Greater Sensitivity Cuts Costs — Speeds Tapping

## NEW Procunier Foot Pedal Tapping Machine

New advanced design, new construction features mean new speed and accuracy for all kinds of tapping. Special compensating springs assure accurate tapping . . . even with "green" operators. Two long, compensating springs take all the guesswork out of both bottom and through tapping. Tap feeding and reversing pressures may be preset for each tapping job. Dull or "loaded" taps are quickly spotted. The automatic lubricating system delivers just the right amount of lubricant to the tap each time the foot pedal is depressed. Two interchangeable tapping heads accommodate a wide range of tap sizes.

As a result of these, as well as many other advanced features, tap breakage is reduced . . . accuracy is increased . . . production is speeded up. Larger Procunier Tapping Machines, both with and without special lubricating systems, are available.

Write today for illustrated bulletins on Procunier Tapping Machines, Tapping Heads and the new lightweight Tru-Grip Tap Holder.



# Procunier

*Safety Chuck Company*

12 S. Clinton St.

Chicago 6, Ill.



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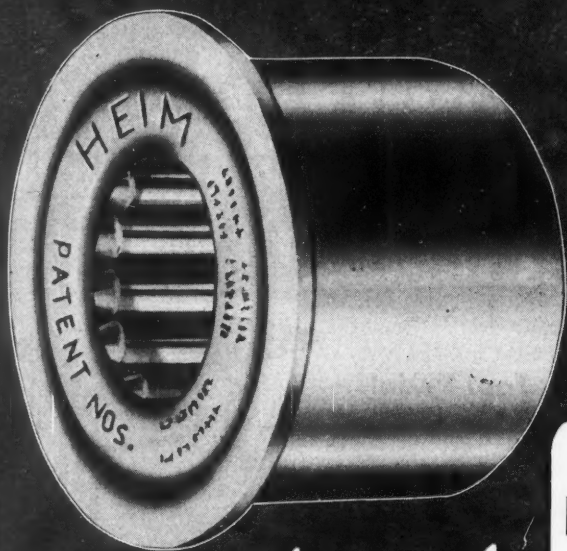
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- ☐ Procunier High Speed Tapping Heads
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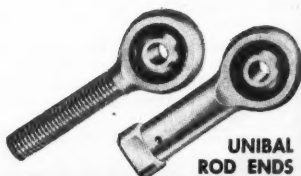
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ROLLER  
BEARING**

The Heim Flanged Type Self Contained Roller Bearing is inexpensive and extremely simple to mount. It is only necessary to bore and ream the hole and press the bearing in. No shoulder needed against which to locate. Flange provides means for taking axial thrusts or shocks. Designed to retain lubrication and exclude dirt and foreign matter. Made in two types — light duty for use where r.p.m. is low and loads light; and a heavy duty, heat treated bearing for heavy loads.

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ON STANDARD SIZES**

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ROD ENDS • DIE POLISHING  
MACHINES.**



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ROD ENDS**

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*In Your Own Plant*

- Install anywhere by simple wire connection. Quiet in operation. No fumes or odors—no ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hold 1600° F. in Model 3 furnaces, with 2¢ per kw.-hr. rate. Others in proportion.

**NOW YOU CAN** heat treat, harden and temper small parts in your own plant . . . without experienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity. Here are some profitable uses:

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CHAMBER	8"W 6"H 14"L	10"W 8"H 18"L	8"W 6"H 14"L
FROM COLD	1850° F. in 55-65 min.	1850° F. in 55-65 min.	2000° F. in 2½ hrs.
AMPERES	14.8 at 230 v.	19.6 at 230 v.	20.2 at 230 v.
WATTS	3400	4500	4650
MODEL*	MH-3 VH-3 MK-3 VK-3	MH-4 VH-4 MK-4 VK-4	VK-5
PRICE	146.00 166.00 186.00 206.00	222.50 242.50 262.50 282.50	320.00

- \* M models complete with hinged door and hearth plate.  
V models have counterweighted vertical lift door with adjustable opening.  
K models include Selective Power Modifier for input control to correct temperature lag.

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Electronic operated Veri-Tron Indicating and controlling pyrometer, with thermocouple and lead wire .....\$143.00  
Same in self-contained, enclosed panel including line switch and fuses, with steel stand—completely wired ..... 240.00  
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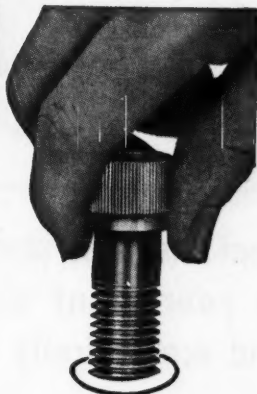
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This "Unbrako" Socket Head Cap Screw with the Knurled Head saves time, facilitates compact designs, reduces weight and cost. The knurling provides a slip-and fumble-proof grip—even though the fingers and heads be ever so oily—therefore, it can be screwed-in faster and farther before it becomes necessary to use a wrench. Available in sizes from No. 4 to 1½" in diameter and a full range of lengths, millions upon millions are in use throughout industry. Write for your copy of the "Unbrako" Catalog.

You can't screw socket screws in or out without a hex socket wrench, so why not get our No. 25 or No. 50 "Hallowell" Hollow Handle Key Kit which contains most all hex bits.

OVER 44 YEARS IN BUSINESS



Knurling of Socket  
Screws originated with  
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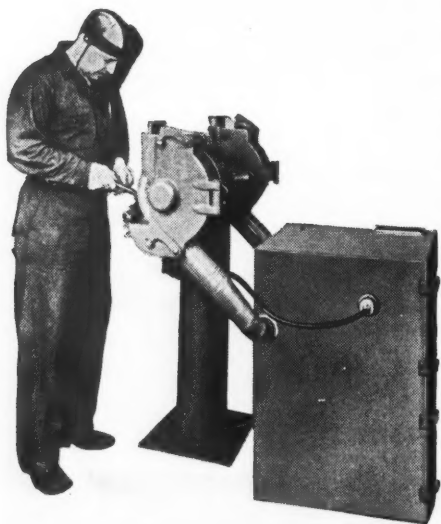
KITS:  
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JENKINTOWN, PENNA. BOX 556 BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO



Beat the dust problem  
in your plant simply  
and economically with



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## DUST COLLECTORS

Running only when the machine is operating, TORIT Dust Collectors collect abrasive dusts at their source. They eliminate extensive piping and recirculate the cleaned air back into the room.

TORIT Dust Collectors range in size from  $\frac{1}{3}$  to 3 HP. Compact and portable they fit all grinding, polishing and cut-off machines, and all production layouts. For complete information and the latest TORIT catalog write:

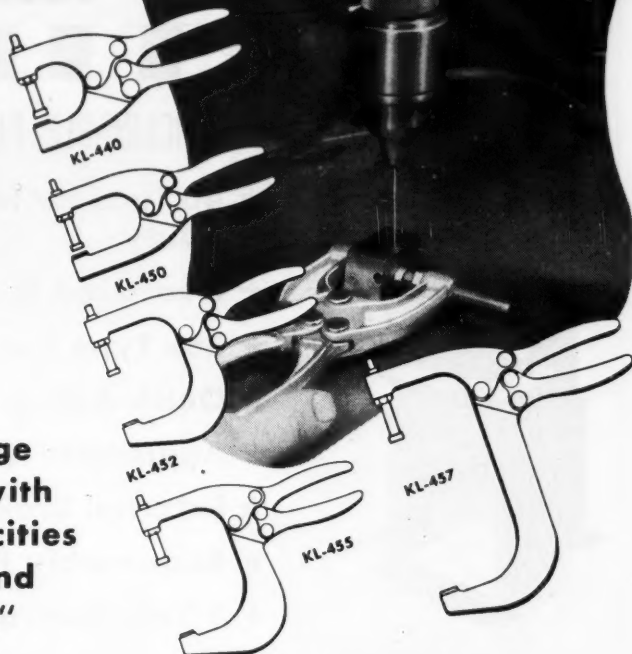
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WHAT SIZE  
FOR WHAT JOB?

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... is a range  
of models with  
throat capacities  
up to 6" - and  
depth to 2 3/8"



... designed for holding work while welding, drilling,  
or for use as a part of permanent fixtures. Very handy.  
Spindle pre-set for desired thickness. Normal hand  
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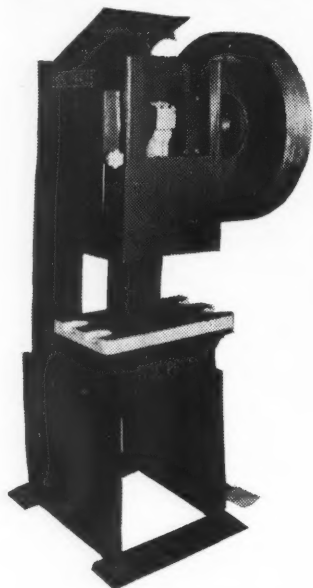
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**A NEW Durable  
ALL STEEL, ALL PURPOSE  
30 TON.**

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**INCLINABLE PUNCH PRESS**

- ★ 40 Tons for Intermittent Duty
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- ★ Box Type Construction
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**(DEALERSHIPS AVAILABLE — TERRITORIES OPEN)**

Stroke ..... 2½" or 3"  
Distance between gibs ..... 9"  
Adjustment of slide ..... 3"  
Bolster plate area ..... 13½"x23"  
Opening in bed ..... 8"  
Bolster plate thickness ..... 1⅞"  
Strokes per minute ..... 125

Shut height stroke down  
adjustment up ..... 8½"  
Flywheel diameter ..... 28½"x5¼"  
Gross weight ..... 3000 lbs.  
Floor space ..... 32"x32"  
Overall height ..... 6'2"  
Motor requirement ..... 2 HP

**INTERCHANGEABLE FRAME FOR A FULLY HYDRAULIC HI-SPEED DRAW PRESS**

**(Write for further information)**

**MANDEL - CAMRAS MACHINERY COMPANY, INC.**

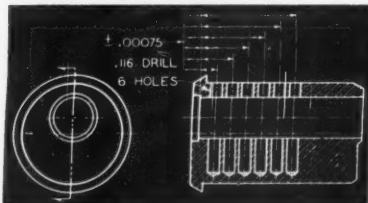
**809 W. LAKE ST.**

**CHICAGO 7, ILL.**

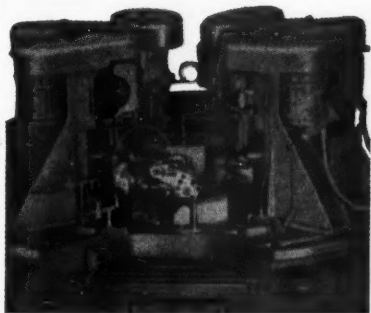


# MULTIPLE DRILLING FOR HIGH PRODUCTION

**PROBLEM** Drill 6 parallel holes in brass lock cylinders, locating each hole within  $\pm .00075$ .

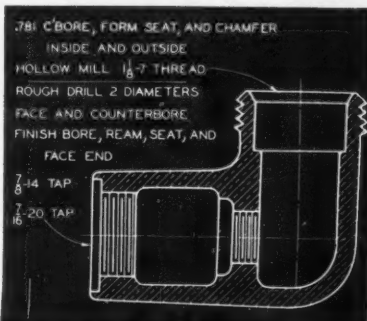


**METHOD**  $\pm .00075$  ACCURACY IN LOCATION for each hole is obtained by drilling every hole without disturbing the work. Furthermore, the tool guide bushings are supported in plates that are piloted onto the fixtures. Each piece is chucked in one of seven identical fixtures, indexed automatically to each drilling unit, and automatically ejected.

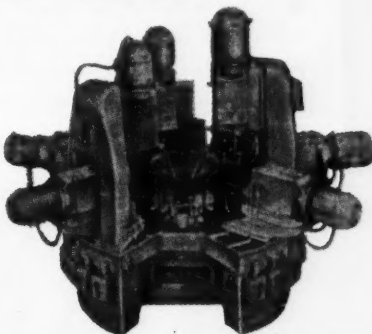


**RESULTS** 1,000 PIECES PER HOUR GROSS, with one operator, excellent quality control, less handling and less floor space. The use of individual standard units lowers the first cost and permits the utmost efficiency for each operation. These savings quickly pay for the machine.

**PROBLEM** Machine each corner of 2-way and 4-way brass show-er valve units.



**METHOD** WITH ONE CHUCKING PER CORNER all operations are completed on this 9-spindle automatic indexing machine. Each of the seven identical fixtures on the index turret holds the valve units in different positions for machining each corner.



**RESULTS** 600 CORNERS PER HOUR GROSS with one operator.

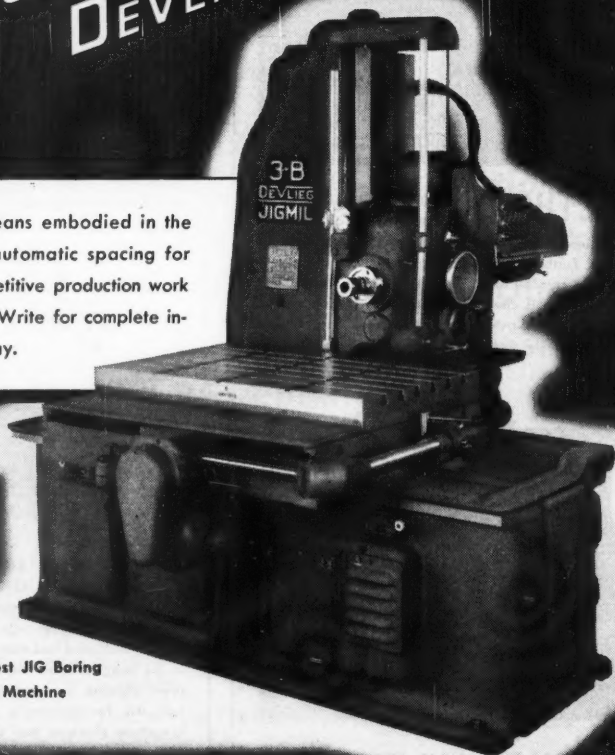
If multiple drilling operations up to five hp each are required on your high production work, we can design, build and tool automatic machinery all ready to be installed and started up. Just send us the prints showing the operation and hourly production and ask for proposals.

Kingsbury Machine Tool Corporation, Keene, N. H.

## KINGSBURY

# *Announcing* **DUPLITROL** DEV LIEG

● A new means embodied in the JIGMIL for automatic spacing for duplicate repetitive production work without JIGS. Write for complete information today.



The World's Finest JIG Boring  
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DEV LIEG MACHINE COMPANY



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NOPAK Reciprotrol Valve mounted on Arbor press results in fast, semi-automatic, air-powered operating cycle.

## *Faster Mounting Less Fatigue*



### **— with NOPAK Reciprotrol Valve**

This hand-operated arbor press, employed to mount tires on tricycle wheels, was converted to fast, semi-automatic operation by the application of a NOPAK Model D Air Cylinder controlled by the new, revolutionary Reciprotrol Valve.

Now, the operator merely places the tire, mandrel and wheel in position and trips the Reciprotrol Valve with the touch of a finger. The cylinder then automatically presses the tire on to the wheel and returns to starting position while operator picks up units for the next assembly.

The result? Mounting time cut 50%; operator fatigue reduced to a minimum. In fact, where formerly two men relieving each other in an 8 hour shift were required, the machine is now attended by one woman operator working a full 8 hour shift.

**GALLAND-HENNING MFG. CO., 2758 S. 31st Street, Milwaukee 7, Wis.**

NOPAK Reciprotrol Valve provides full, semi-automatic or manual control of length, speed and position of cylinder stroke. Write for details.

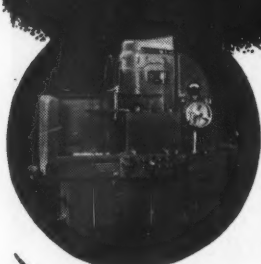
# **NOPAK**

## **VALVES AND CYLINDERS**

**DESIGNED for AIR and HYDRAULIC SERVICE**

A 5180-P

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BLANCHARD GRINDER

+



BLANCHARD WHEELS

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Blanchard Service is available to every Blanchard owner. One of our Demonstrators will assist you in your own shop, or send us two or three chuck loads of pieces. We will grind them and give you a complete report.

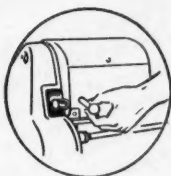
**SEND FOR BLANCHARD WHEEL BOOK**



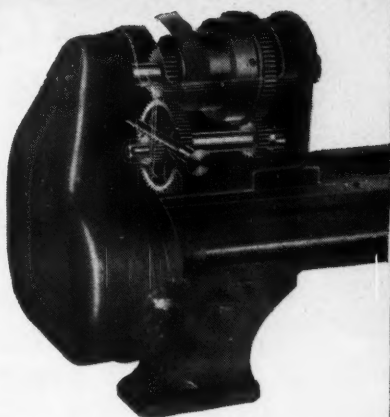
*The* **BLANCHARD MACHINE COMPANY**

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**Logan** A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

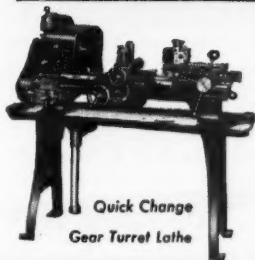


**Finger Tip Control for Safety,  
Ease and Speed in Shifting  
Back Gears**



**BACK GEARS  
ENCLOSED IN  
HEADSTOCK**

**PLUS PATENTED SHIFTER RACK INCREASES  
SAFETY AND EFFICIENCY,  
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Gear Turret Lathe**

**SPECIFICATIONS COMMON TO ALL LOGAN LATHES** . . . swing over bed,  $10\frac{1}{2}$ " . . . bed length,  $43\frac{1}{4}$ " . . . size of hole through spindle,  $25/32$ " . . . spindle nose diameter and threads per inch,  $1\frac{1}{2}$ "—8 . . . 12 spindle speeds, 30 to 1450 rpm . . . motor,  $\frac{1}{2}$  hp, 1750 rpm . . . ball bearing spindle mounting . . . drum type reversing motor switch and cord . . . precision ground ways, 2 V-ways, and 2 flat ways.

Logan advanced design encloses back gears in the headstock and places the Patented Shifter Rack which controls these gears on the front side of the headstock, at the operator's finger tips. There is no need to reach over the headstock, or to lean forward close to moving parts to shift the back gears. The operator avoids risk and makes the shift more easily and quickly. Here is another example of the practical designing which makes Logan Lathes outstanding in accuracy, speed, durability and safety, and in trim, clean cut appearance. For full information, see your Logan Lathe dealer, or write direct for the Logan catalog.

L-2

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EXPERIENCE is knowledge gained by practice. Experience gained over a period of more than 30 years is reflected today in every operation in each of the four modern Allied plants.

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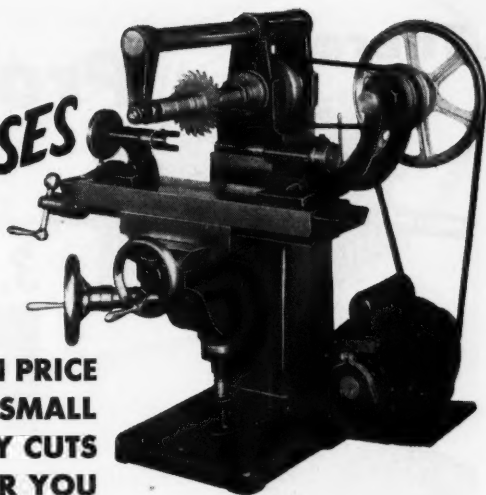


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SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS  
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**OWN THE  
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- POWERED FOR HEAVY CUTS
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## *The Welch Milling Machine* **HAS LARGE MACHINE ACCURACY AND FEATURES**

There's a place in every shop, large or small, for one or more of these efficient, high speed machines.

The Welch Milling Machine is being used successfully in tool-making, shop production, experimental departments, laboratories, schools and home work shops. Built by master craftsmen to help other craftsmen master a large variety of jobs. Investigate this outstanding performer at once.

Specifications: Bench space required 13 inches x 24 inches. Spindle—1½ inches in diameter—8 pitch thread—15/16 inch hole through entire length; nose bored for No. 3 Morse taper. Spindle designed so that all 10 inch lathes, chucks, collets, face plates, etc., fit same. Arbor diameter 7/8 inch and 1 inch with No. 3 Morse Taper. Center of arbor to underside of arm—6 inches.

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*Welch*

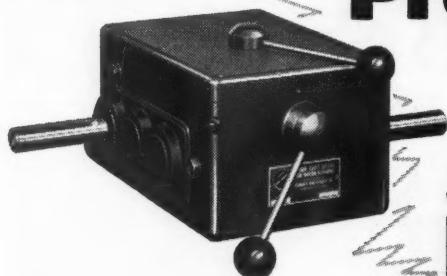
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MUNCIE, INDIANA

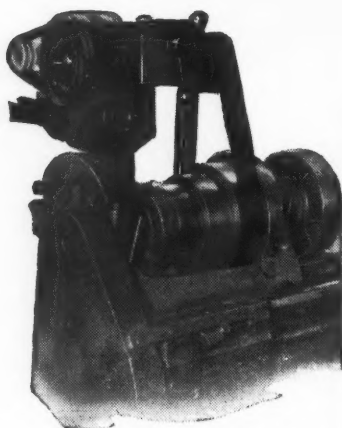
**There Is**

# **Production Magic**

**in the New  
3, 4, 6, 9-SPEED**



**TURNER**  
**UNI-DRIVE**  
Motorizes Machine Tools



**No. 509 L  
LATHE DRIVE**



**No. 309 SMB  
SPECIAL  
MOUNTING  
BASE**

Get more work from your older machine tools ... make them carry a full production load. Install the Turner UNI-DRIVE! This remarkable selective sliding gear transmission is now equipped with 3, 4, 6, and 9 speeds. Provides proper speed for any job. Operates each machine independently ... eliminates overhead line and counter shafts. No belts to shift. Makes machines more versatile. Boosts output ... saves time ... reduces power costs. Drives to large step of machine cone at all speeds. Thousands are in use, with outstanding production records.

Lathes, turret lathes, shapers, milling machines, hand and automatic screw machines, boring mills, hobbing machines, bench and small machine tools and dozens of other applications produce with increased efficiency with UNI-DRIVE. Two handles shift speeds through three ranges of three speeds, 3 to 1 ratio in each range ... overall ratio  $9\frac{1}{2}$  to 1 in the 9 speed transmission. Also available are the new "slow speed" series. Built with one additional reduction, these will be 50% slower throughout the same cycle of ratios.

Now is the time to speed up your plant ... now is the time to install the Turner UNI-DRIVE!

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(Sales Div., Turner Machinery Co.)

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FREE CATALOGS ON  
Automatic  
Punch Press  
Feeds

*Tells How*  
**DICKERMAN FEEDS**  
• Reduce Production Costs  
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*Write Today* ... for these new fact-packed catalogs containing valuable time, money and material saving helps for all punch press owners. Many informative and illustrated installation photographs — descriptions of Dickerman Die and Hitch Feeds.

**H. E. DICKERMAN MFG. CO.**

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HIGH OPERATING SPEEDS

LOW AIR CONSUMPTION

In these air-operated press welders manufactured by The Taylor-Winfield Corp., Warren, Ohio, T-J Cylinders contribute to the rapid and efficient operation of the machines. The cylinder is employed to move the welding head to the work and return—a job performed by T-J with *accuracy, speed and dependability!*

This is typical of the widespread use of T-J Cylinders today to simplify operations and save time and labor. There's a T-J Air or Hydraulic Cylinder *exactly right* for all kinds of tough jobs where pushing, pulling or lifting is needed . . . 100 lb. or 50,000 lb. Available in many standard sizes and styles . . . both cushioned and non-cushioned types. Backed by 30 years of know-how . . . T-J engineered to do the job *better and cut costs!* Write for latest catalogs. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



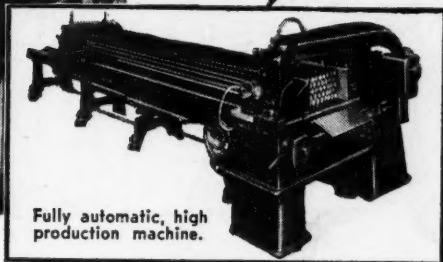
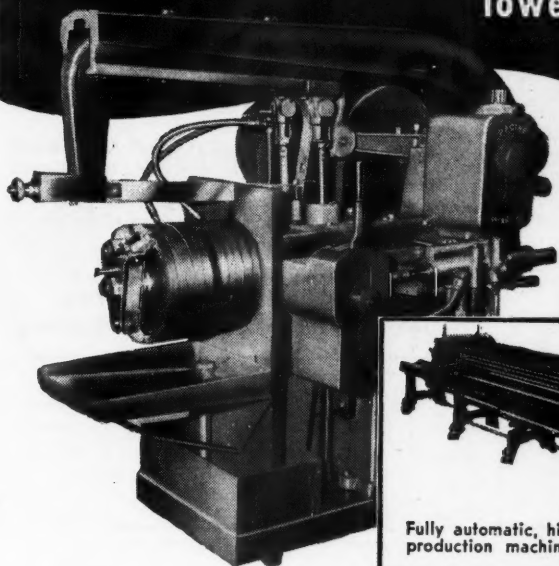
**TOMKINS-JOHNSON**

WINDMILLS AIR AND HYDRAULIC CYLINDERS COILS COILMACHINES



# A RACINE METAL CUTTING MACHINE

lowers the cost of  
finished coils



Fully automatic, high  
production machine.

The special RACINE Machine shown here, cuts 10 ring gear blanks at one time. Ten cut off rings in 1½ minutes. A quick-acting, hydraulically actuated mandrel expedites loading, insures big production.

Metal cutting specialists for nearly forty years, RACINE can give you a quick and correct solution on all cutting off work. Many operations now performed in other more costly ways, may be easily handled on specially designed and tooled

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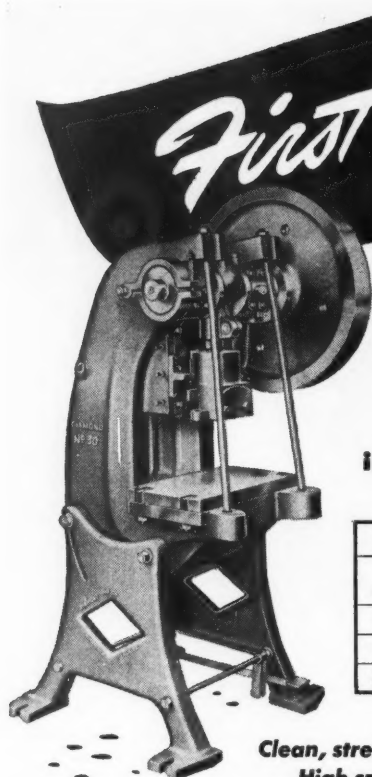
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For any power movement operation. Pumps are Variable Volume design, capacities 12 to 30 G.P.M. Pressures 50 to 1000 p.s.i. RACINE Sleeve Type Valves in ¾" to 1½" sizes. Write for Catalog P-10-C.



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*First Choice*  
FROM ALL ANGLES

... design  
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## **Diamond** OPEN-BACK PUNCH PRESSES INCLINABLE

in 9 14 30 Ton Ratings

### QUICK SPECIFICATIONS

Model	Standard Stroke*	Shut Die Height	Frame Opening	Flywheel Speed
9 Ton	1 1/2"	7"	5 1/2"	185 max.
14 Ton	2"	9"	6 1/2"	150 max.
30 Ton	3"	9"	10 1/2"	125 max.

\* Longer strokes available upon special order.

**Clean, streamlined appearance • Careful craftsmanship**  
**High speed performance • Safe, easy operation**

### FEATURES

**CRANKSHAFT**—Chrome nickel steel—precision ground all over. Bearing surfaces finished to 20 micro-inches.

**RAM**—Bearing surfaces precision jig-ground, hand scraped for individual fit. Exclusive floating-type fully universal ball screw and nut maintains close alignment over full ram stroke.

**GIBS**—Precision sliding surfaces ground to 20 micro-inches.

**CLUTCH**—Positive, instantaneous contact with three sets of pins engaging flywheel.

**FLYWHEEL**—Extra heavy for smooth operation and maximum energy. Mounted on oversize bronze bushing.

**FRAME**—Massively constructed semi-steel castings, correctly designed for high overload protection.

DIAMOND PUNCH PRESSES are among America's finest machine tools...Sleek and trim, yet designed for amazing strength. High overload capacity. Smoothly finished and accurately fitted in every detail. Production tolerances so close that parts are uniformly interchangeable!

If you want to punch holes in your production quotas, see these improved Diamond Punch Presses! Available from dealers throughout the nation. Write for FREE circulars!

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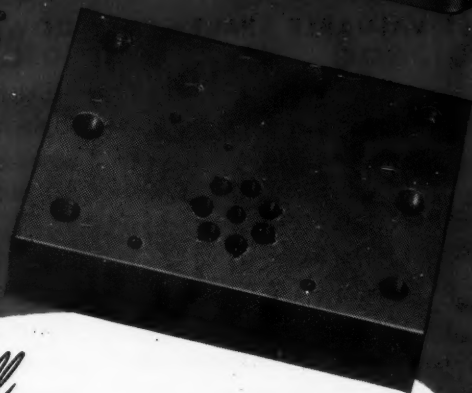
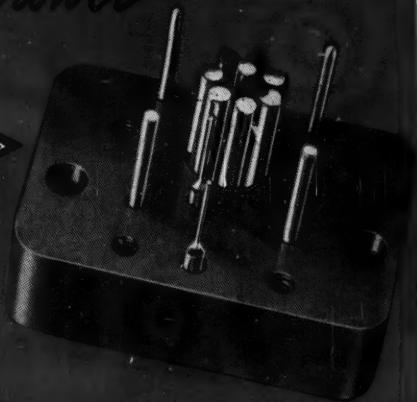
TODAY'S *Keynote*  
**PRODUCTION ECONOMY**

TODAY'S *answer*

**INVARO**

These Invaro oil-hardening steel blanking dies are meeting a difficult requirement of close tolerance—held to .003 after heat treating . . . no tendency to shrink, warp or change dimensions. Uniform hardness and long life mean high production at low cost.

Look into INVARO for operations such as blanking, punching, forming, piercing, perforating, etc.



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# ONE *for* TWO jobs



**benchmaster OFFERS A  
LOW-PRICED BENCH MACHINE  
FOR BOTH HORIZONTAL  
AND VERTICAL MILLING**

*benchmaster mill with  
horizontal spindle overarm*

## **SAVES VALUABLE SPACE—CUTS DOWN EQUIPMENT COSTS**

Now you can obtain a precision perfect, high-speed *benchmaster* milling machine that's easily convertible from a horizontal to a vertical miller by simply interchanging spindle attachments. Its *unusual* versatility, plus the *usual* quality-plus *benchmaster* workmanship, make this double-duty milling machine an outstanding addition to your shop.

**SPECIFICATIONS:** Table size—6" x 14"—Three Tee Slots  $\frac{3}{8}$ ", 2" center Longitudinal travel  $8\frac{1}{2}$ "—Traverse travel  $5\frac{1}{2}$ "—Vertical travel  $8\frac{1}{2}$ " on vertical mill— $9\frac{1}{2}$ " horizontal mill—Height 28"—Weight (less motor) 215 lbs.—Requires  $\frac{1}{3}$  h.p. motor—Spindle speeds (standard 1725 rpm motor) 450-850-1400-2100 rpm.

**For complete information write to Dept. MM-4.**

***benchmaster***

**MANUFACTURING COMPANY  
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**Stock Sizes or "Specials"**  
**... to meet any requirement**

**R**EGULARLY STOCKED in 1088 sizes ranging from  $\frac{1}{4}$ " x  $\frac{3}{8}$ " x  $1\frac{1}{4}$ " to 4" x  $4\frac{1}{2}$ " x 6", Buckeye stock bearings are the time proved answer for most requirements. For others, Buckeye "Specials" furnished in any recognized bronze bearing analysis; and in any ID, OD and length; slotted, split, drilled or flanged; plain, graphited, or with machined oil grooves, will meet exactly, your own particular, individual needs.

Manufactured from selected materials under our exacting laboratory and metallurgical control, these bearings measure up fully to Buckeye's exacting specifications. Each is a quality product, free from porosity and accurately dimensioned within the required limits assuring speedy, easy assembly, and long, efficient service. Let us quote on your requirements.

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**BRASS AND MANUFACTURING COMPANY**

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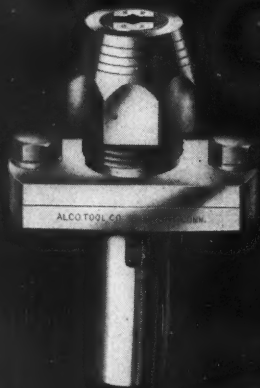
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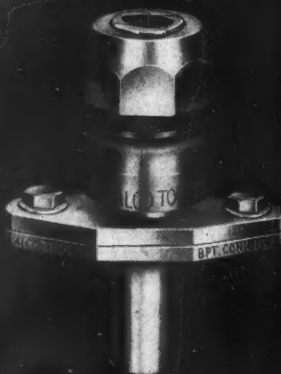


BRONZE SLEEVE BEARINGS - STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT  
IN ANY RECOGNIZED BEARING METAL ANALYSIS

FOR AUTOMATICS



## ALCO TAP HOLDERS



RELEASING MODEL  
FOR HAND SCREW MACHINES  
AND TURRET LATHES

**ALCO TAP HOLDERS**  
*Help Tool Conservation*



Don't just take it for granted that tap breakage is a necessary evil. If you use ALCO Tap Holders you can reduce your breakage to a minimum and at the same time increase production and reduce set-up time.

No all out effort can be made to reach top production from your taps unless the tap and the hole are in perfect alignment. ALCO Tap Holders accomplish this absolute concentricity through the application of the patented floating feature of this precision built tool.

You won't need bushings and you can deliver more perfectly threaded pieces for the assembly room.

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152 Birdseye Street, Bridgeport, Conn.  
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CLEAN AIR

2

SMOOTH

AIR

OILED

AIR



## Get All Three

from one compact assembly—the Norgren Lubro-Control Unit. Assures higher production and longer life from tools and cylinders.

Filter **CLEANS** the air, knocks out solids, moisture and oil emulsion. Regulator **MAINTAINS** air-power at right pressure for maximum performance. Lubricator **OILS** the air that drives the tool or cylinder. Protects against wear while equipment operates; against rust and corrosion while tool is idle. Filter, regulator, or, lubricator available separately or in any combination.

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222 Santa Fe Drive  
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# Norgren

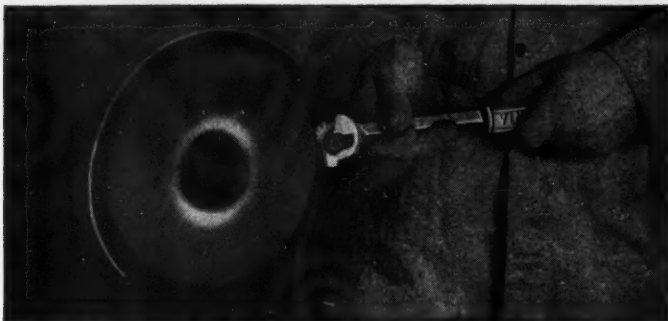
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## MORE PRODUCTION PER WHEEL DRESSING

*with*



### VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS and CUTTERS

The cleaner—more accurately a grinding wheel is dressed, the less frequently the operation is necessary.

Vincent-Huntington Grinding Wheel Dresser Cutters—made of special steel and heat-treated to an exact hardness by an exclusive Vincent process—wear longer and do not break or mush-over on the toughest hand dressing and truing applications, thus producing a cleaner, more accurate grinding wheel surface. The result—more production per wheel dressing . . . more dressings per dresser cutter.

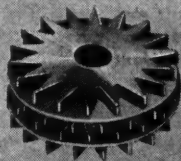
Complete stocks, in styles and sizes to cover your every hand dressing and truing need, carried at your mill supply house.

**FOR CORRECT DRESSER  
SIZE USE THIS CHART**

- ★ Use #0 Dressers on Wheels up to 1½" Face.
- ★ Use #1 Dressers on Wheels 1½" to 2" Face
- ★ Use #2 Dressers on Wheels over 2¼" Face
- ★ Use #11 or #22 Dressers on Wheels of extra wide Face



*Vincent*  
HUNTINGTON  
NEW IMPROVED  
GRINDING WHEEL  
DRESSERS and CUTTERS



*Vincent*

STEEL PROCESS  
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- A NEW INVENTION!
- A NEW MACHINING METHOD!  
ROTARY BROACHING \*
- A NEW NAME-"ROTARY BROACH" \*

**ROTARY BROACHES** may be used in lathes, turret lathes, automatics, drill presses, etc., to replace reamers. They produce perfect holes with finishes that can only be compared to honing. They last longer before grinding is necessary and may be resharpened 10 to 30 times. They produce perfect holes at a fraction of the cost of those produced by other methods. Eliminates grinding, lapping, honing and boring.

**USE THIS NEW MACHINING METHOD—ROTARY BROACHING\***  
**You Cannot Afford Not To Use Rotary Broaches (Write for free descriptive literature)**

\* "Rotary Broach" and "Rotary Broaching" are new names coined and copyrighted by Shearcut Tool Company.

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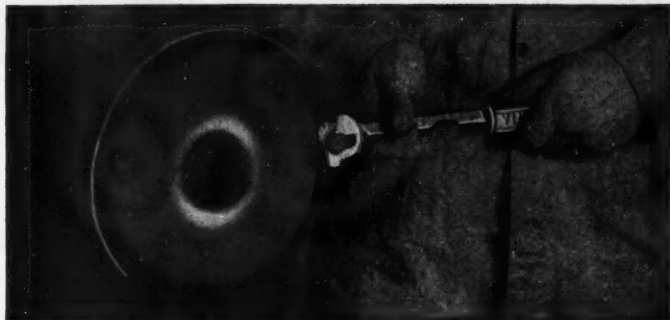
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DEPT. A-3 RESEDA, CALIFORNIA

**ORDER THROUGH YOUR NEAREST INDUSTRIAL SUPPLY HOUSE**

## MORE PRODUCTION PER WHEEL DRESSING

*with*



### VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS and CUTTERS

The cleaner—more accurately a grinding wheel is dressed, the less frequently the operation is necessary.

Vincent-Huntington Grinding Wheel Dresser Cutters—made of special steel and heat-treated to an exact hardness by an exclusive Vincent process—wear longer and do not break or mush-over on the toughest hand dressing and truing applications, thus producing a cleaner, more accurate grinding wheel surface. The result—more production per wheel dressing . . . more dressings per dresser cutter.

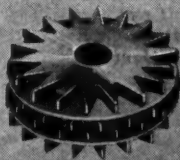
Complete stocks, in styles and sizes to cover your every hand dressing and truing need, carried at your mill supply house.

#### FOR CORRECT DRESSER SIZE USE THIS CHART

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- ★ Use #11 or #22 Dressers on Wheels of extra wide Face



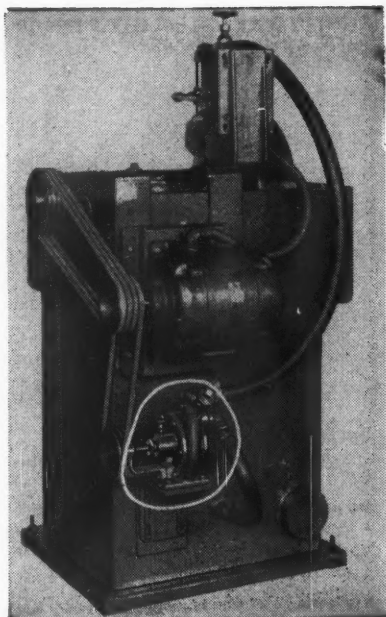
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NEW IMPROVED  
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TRADE MARK  
**FULFLO**  
REG. U. S. PAT. OFF.

# COOLANT PUMPS

●  
CUTTING TOOLS AND WORK  
SURFACES ARE HELD TO  
PROPER TEMPERATURES  
●

**I**T'S all a matter of degree . . . but the degree of heat at which work and tools must be held is so important that you dare not risk ruining either.

**FULFLO CENTRIFUGAL COOLANT PUMPS** bring the coolant medium right to the right spot . . . right where needed, uniformly, smoothly, constantly.

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problems.*

Standard or specially designed models in unlimited flexibility of purpose.

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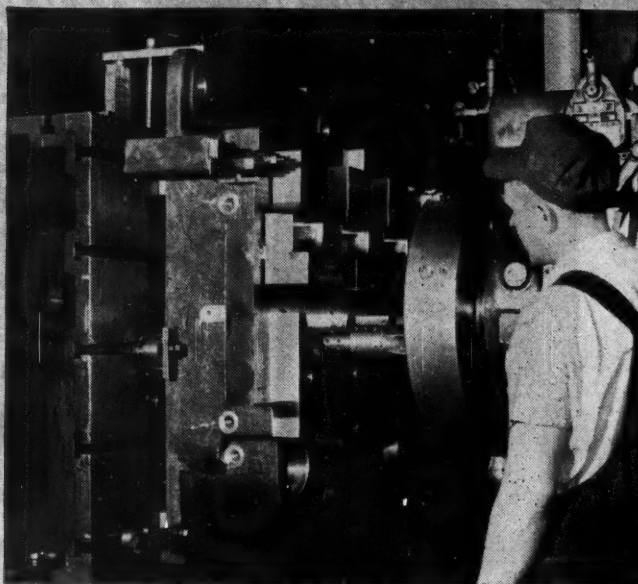


**Specialties Co., Inc.**

BLANCHESTER, OHIO

# *Now* Danly Special Die Sets

**with  
any  
additional  
machining  
required**



New equipment installed in the Danly shop permits us to do any machine work on large or complex die sets incidental to the mounting of the dies. Inserts, recesses, additional boring, keyways and other machining can be done to the customer's specifications.

Time is saved by this service as work on dies and on the die set can be done at the same time. It permits the die shop or tool room to devote their equipment and man hours to the making of dies. The problem of the handling of big sets, for which the die shop or tool room are not generally equipped to do economically, is also solved by this service.

These special die sets are then delivered

ready for the mounting of the dies. Note the size and complexity of the die set shown on this page. This die set—machined at Danly—is an example of the additional machining and service which this company offers.

On your next special die set inquiry include the additional machining work that you wish done at Danly while the die set is being made. The cost of this machining will be shown as a separate item in the quotation.

## **DANLY MACHINE SPECIALTIES, INC.**

2100 South 52nd Avenue • Chicago 50, Illinois

Branches in Principal Cities

# **DANLY** *Special* **DIE SETS**

**MACHINED TO YOUR SPECIFICATIONS**



*Trace the  
family tree*



.... and You Will Find

## **PRESS-RITE PRESSES**

Producing

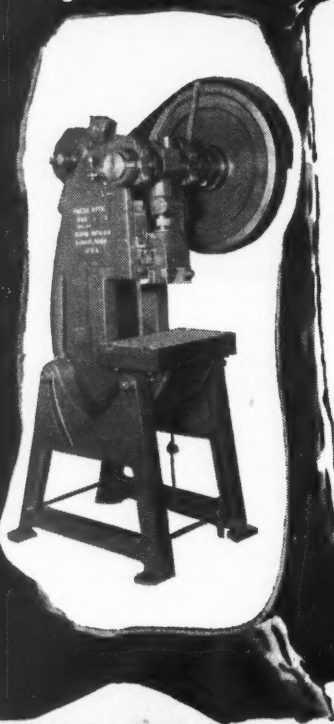
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For More and More

**PRODUCTS**

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*Sales Service Machine Tool Co.*  
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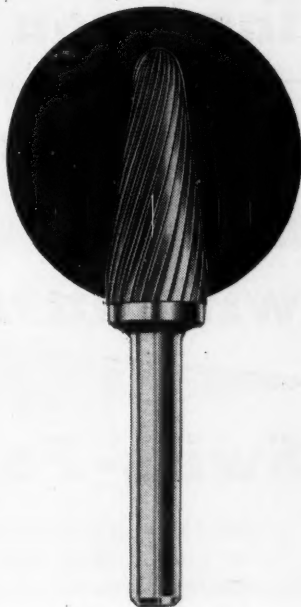


# Carbide Bur Uniformity Pays

Every P&W Master-Ground Carbide Bur is the identical twin of every other one of a designated shape. All P&W Burs run true. Those important characteristics are results of bur Engineering with a capital "E".

P&W Bur uniformity is paying hundreds of users. Results are predictable for each bur, speed and job. Every tooth shares equally in the cutting . . . the bur wears slowly and evenly, holds its shape through many resharpenings, lasts longer, cuts costs.

It will pay you to bank upon P&W Bur uniformity. Ask your P&W Man for the correct application data for your machines and your jobs.



*A 14° included angle carbide bur with a 1/8" nose radius for finishing or touching up a die with a 7° relief angle. Photo shows medium cut — also available in fine or coarse cut.*

**PRATT & WHITNEY**

Division NILES-BEMENT-POND COMPANY

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that you can file the

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## Swiss-Pattern File.

For 45 years, "American Swiss" has been making precision files for the jobs that ordinary files can't handle. The 3000 different shapes, sizes and cuts of "American Swiss" Swiss-Pattern files provides exactly the right selection for any finishing filing work, and these uniformly hard accurately made tools assure best results in least time.

AS-134

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# SWISS PATTERN FILES

# Hydratrol Lathes

HEAVY DUTY TYPE



**"THE  
BEST LATHE  
EVER MADE!"**  
SAYS AUSTRALIAN MFR.  
OF PRECISION PLASTICS

**T**HE above photo, taken in the plant of E. W. Tilley, Melbourne, shows a 24" Heavy Duty HYDRATROL LATHE. The operator is turning dies for use in the production of Precision Plastics. A steel billet is shown, ready to go into the lathe.

In a recent letter, this concern said: "We have had lathes from all nations in use these twenty-five years, but your lathe is certainly something to be proud about.

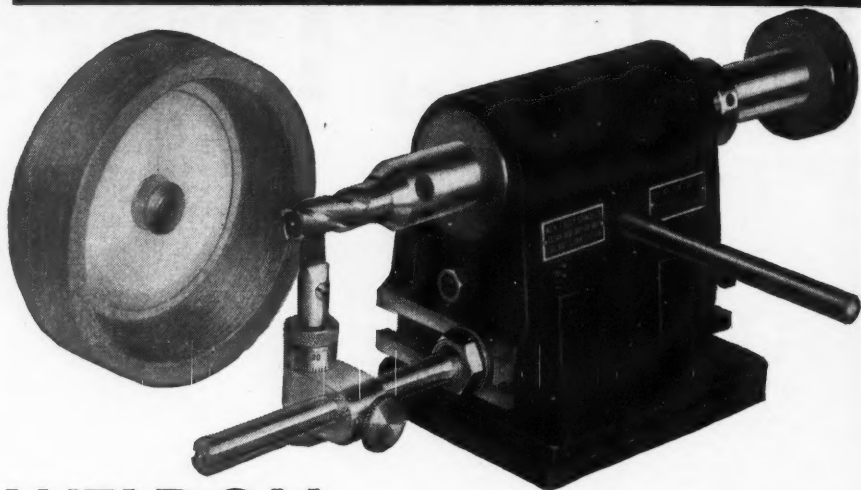
"We have found that the design is really marvelous, and has been carried out to perfection.

"I, and all my business friends that have seen this Hydratrol Lathe working, agree that it is the best engine lathe ever manufactured."

Let us show you what a Heavy Duty HYDRATROL LATHE could do in your shop. Sizes 20" to 36". Also Large Hollow Spindle Type—sizes 18" to 36".

**Lehmann MACHINE COMPANY**  
CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI

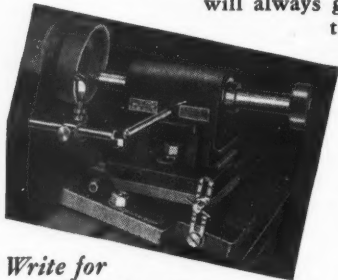
YESTERDAY'S PIONEER . . . TODAY'S LEADER



# WELDON

## *End Mill Sharpening Fixture*

The *Weldon* Sharpening Fixture quickly resharpens end mills from  $\frac{1}{8}$  to 2" inclusive. Requires no centers or lead cams. Unnecessary to line up the fixture as it will always grind straight. Designed for any grinder with flat table. No table movement necessary. Requires little skill to operate.



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Folder No. 590

### **WELDON Adjustable Sub-Base** *makes sharpening end teeth easy*

Designed for easy attachment to the Weldon Sharpening Fixture the Sub-Base adjusts to any selected angle and makes simple the job of sharpening the end teeth of all style end mills. No alterations needed. Simply bolt to Fixture through same slot used to fasten Fixture to grinding machine.

# THE WELDON TOOL CO.

*Cleveland 4,  
Ohio*



3000 WOODHILL ROAD

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## **DRILLING MACHINES**

**24" and 28" Swing**

**GREATER PRODUCTIVITY**

**LOW INITIAL COST**

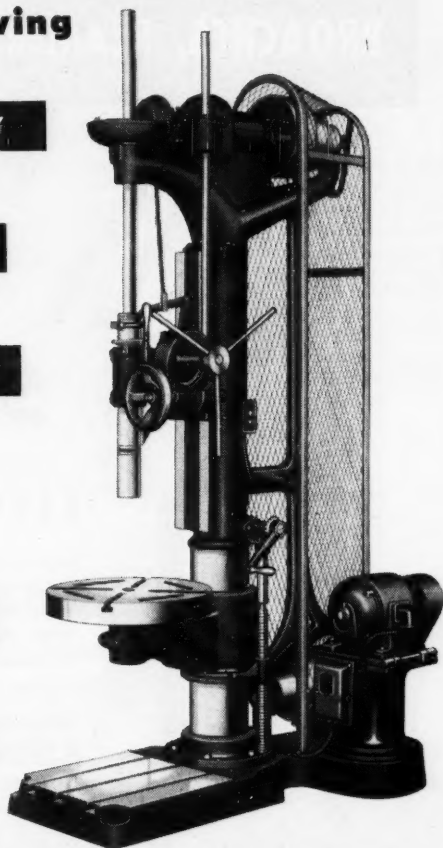
**LOW MAINTENANCE**

**LONG LIFE**

**EASY OPERATION**

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**SIBLEY MACHINE & FOUNDRY CORP.**

**20 EAST TUTT STREET, SOUTH BEND, IND.**

*For Straight  
Hardening*

**LONG, SLENDER HIGH-SPEED  
STEEL TOOLS, SPINDLES,  
BROACHES, REAMERS, ETC.**



**SENTRY MODEL "YP"  
VERTICAL FURNACE**

## **SENTRY** MODEL YP VERTICAL ELECTRIC FURNACES

Large or long, slender high-speed steel tools, broaches, spindles, etc. are best hardened in the specially designed Sentry Model YP Vertical Electric Furnace. Employs the Sentry Diamond Block Method of Atmospheric Control for maximum quality hardening of molybdenum, tungsten or cobalt high-speed steels. No scale or decarburization.

Finished work is smooth, dimensionally correct and true to shape, saving costly finishing operations.

Sentry Electric Furnaces are made in sizes and capacities to meet your requirements.

You'll be interested in our latest catalog. Ask for bulletin YP-EI.



**The Sentry Company**  
FOXBORO, MASS., U. S. A.





For HEAVIER FEEDS at HIGHER SPEEDS

*Always  
specify*

**CLE-FORGE HIGH SPEED DRILLS**

TRADE MARK REG. U.S. PAT. OFF.

Drilling a single hole in a forged brake lever, as shown in the photo, is not a difficult operation. Yet even in this case, *cost per hole* has been the determining factor in selecting the proper drill for the job. ♦ On this basis you will find that CLE-FORGE High Speed Drills give you maximum results at minimum cost. Because these drills consistently take heavier feeds at higher speeds, they produce holes at lower cost.



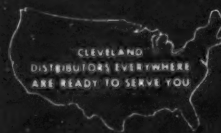
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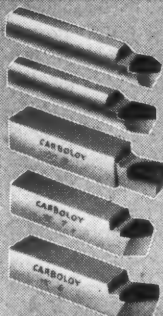
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200 EAST GRAND BLVD. DETROIT 13 • 102 NORTH FIELD ST. DALLAS 1  
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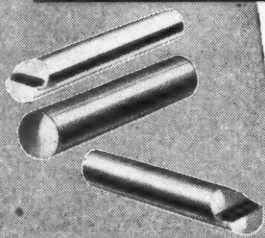




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Finish-Ground . . . ready to go.



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# MODERN Machine Shop

APRIL, 1947

VOL. 19, No. 11

CINCINNATI, OHIO

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## *This Month*

The first article in this issue features the manufacturing operations in the building of the "Martin 60" streamlined, outboard motor. Special adaptations of the standard equipment and numerous jigs and fixtures are used in the machining of more than twenty-one aluminum die castings as well as the fabricating of many aluminum stampings.

The latest developments in the field of metallizing are explained in the article "Maintenance Metallizing" which begins on Page 136. The author, Mr. Gilbert C. Close, opens with a discussion of the metallurgical characteristics of sprayed metal, then follows with a consideration of four methods of surface preparation prior to metallizing and concludes with a resume of the best technique to employ in the application of spray metal. In his summation, Mr. Close contends that, in general, any experienced machinist will encounter little difficulty in successfully machining sprayed work.

For many years, the broaching process was used in large measure for the production of internal keyways, internal splines, and the finishing of holes. Today, however, broaching machines are also finding widespread application in the finishing of exterior surfaces in high production. An explanation of the surface broaching operation is provided by Mr. George Squibb in his article which begins on Page 168.

A report on the Mid-Winter Personnel Conference of the American Management Association held at the Palmer House in Chicago will be found on Page 184. Mr. Don H. Wimmer, in his usual clear and concise manner of reporting meetings of this nature, presents a digest of the contents of each paper delivered at the conference.

Supplementing the feature articles are the usual departments: the "Ideas from Readers" Page 212, "News of the Industry" Page 224 and "New Shop Equipment" Page 228.

Incidentally, the "Where to Get It" section on Pages 392, 393 and 394 is a handy reference when you're looking for equipment and materials.

If you're interested in cartoons, you'll find one on Page 396.

# Building the "Martin 60"

Manufacturing operations in the building of this well-known outboard motor involve some nice work.

By HOWARD CAMPBELL

Editor, MODERN MACHINE SHOP

**F**ISHING for sport should, as far as possible, be delivered from hard labor; thus a complete set of equipment for fishing in the freshwater streams and lakes of the upper United States and Canada usually includes an outboard motor. The outboard motor is easily transported, easily stored, and easily protected from the weather during the off season, all of which simplifies the problem of power for ease and speed in reaching the fisherman's favorite fishing grounds.

Among the better outboard motors built in this country is the "Martin 60," which is manufactured by Martin Motors, Eau Claire, Wisconsin. Developed and built by engineers who are themselves enthusiastic disciples of Isaac Walton, and produced in a modern factory situated in the midst of one of America's best fishing regions, the "60" is well-known to thousands of fishermen and sportsmen.

The "60" is powered by a two cycle, two cylinder, alternate firing motor of 11.0 cubic inches displacement. It de-

velopes 7.2 horsepower and weighs approximately 43 pounds.

The motor is designed to provide a wide range of speeds, from very slow (for trolling) to a top speed, when driving a light boat, of about 20 miles an hour. This flexibility is largely due to incorporation in the design of the motor a unique feature which consists of a mechanically-operated poppet valve—one for each cylinder—to admit the fuel. The valves have aluminum heads and hardened drill rod stems; thus they are very light.

More than 21 aluminum die castings, together with many aluminum stampings, are used in the construction of the motor. The gas tanks are of stamped aluminum, fabricated by welding. In designing the motor parts, every effort has been made to combine maximum strength with minimum weight.

In the process of building its manufacturing organization to a high point of efficiency, Martin Motors has attempted as far as possible to aid in solving the problems of some of Eau

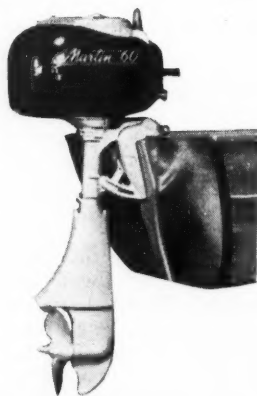
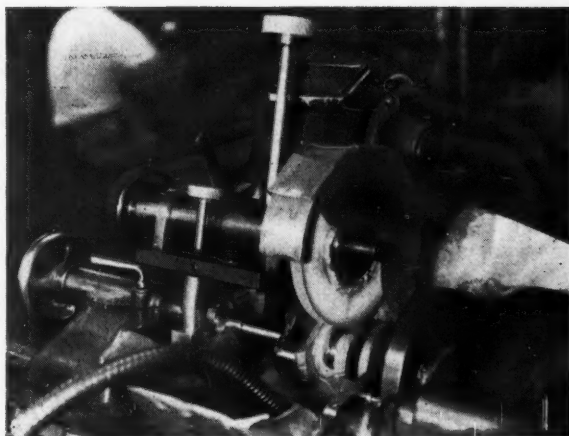


Fig. 1—The cam is ground to form and size in this machine which is a Dumore Grinder mounted on a South Bend Lathe.



Claire's returning veterans. As many of these veterans as possible have been given positions in the Martin plant, and the government's "on-the-job" training program has been adopted in order that these boys may have the benefits of maximum training in a minimum of time and at a minimum of expense.

The outcome of the effort in this direction has been most gratifying. Boys who grew up together, attended school together, played together and went off to war together have returned to live together as neighbors and work together in the same manufacturing plant.

The organization of one department

in the Martin Motors plant includes the personnel of a complete B-29 Fortress crew; captain, co-pilot, navigator, radio operator, gunners, and all the rest of the outfit including the ground crew. As a matter of fact, the members of this department could man every station in a B-29 bomber. The atmosphere thus maintained is productive of a morale level which is reflected in the smooth operation of the plant and the high quality of the product.

Designed for streamlined appearance as well as mechanical efficiency, the manufacture of the "60" involves some interesting operations. An excellent example is found in the grinding of the cam on the crankshaft,

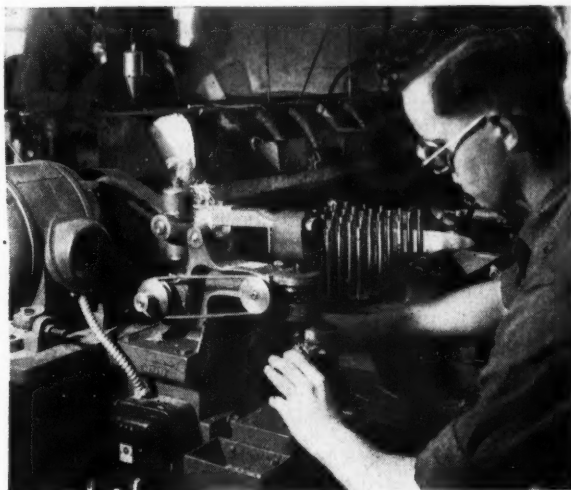


Fig. 2 — Bevel gears are quickly assembled to their shafts with this High Speed Hammer.

shown in Fig. 1. A special cam grinder, to which the job will later be transferred, is in process of development.

To perform this operation, a Dumore grinder was mounted on a South Bend lathe as shown in the illustration, the motor mounting consisting of a hinged platform. The hinge makes it

is chrome-plated to prevent corrosion in use.

The so-called "power head" is the housing in which the major part of the operating mechanism is assembled, consequently the bearings, faces and locating points in this head must be extremely accurate. One of the most

important considerations is the accuracy of the three crankshaft bearings. The three crankshaft bearings are bored with tungsten carbide tools which are located in boring bars driven by two Kingsbury units, set up on a special double - end boring machine as shown in the illustration Fig. 3. Approximately  $\frac{1}{4}$  inch of stock on a

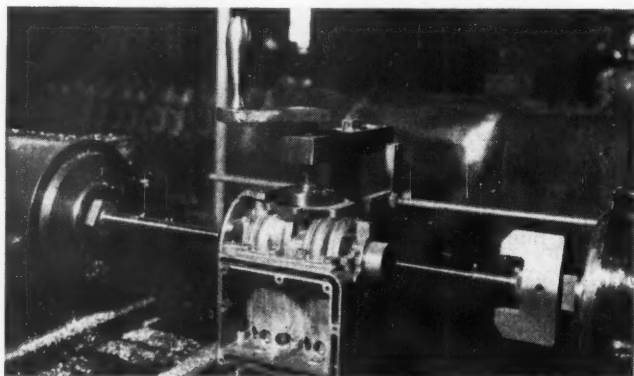


Fig. 3 — Power Head set up for the operation of boring the three crankshaft bearings. The tools are tungsten carbide.

possible for the motor, carrying the grinding wheel, to rise and fall as required to generate the specified contour of the cam. To obtain the correct movement of the grinding wheel, the mounting was equipped with a cam roller which rests against a master cam on the end of the crankshaft. The master cam is a press fit on the crankshaft, and is pressed onto and off from each shaft in turn. To obtain the correct work speed of 39 r.p.m. for the grinding operation, the lathe was equipped with a geared-head motor which reduces the standard speed of the spindle.

In the illustration Fig. 2 an operator is shown riveting a bevel gear to a propeller shaft, using a High Speed riveting hammer. The gear and shaft are made separately, then fitted together and the gear is anchored in position with a 3/16-inch steel rivet. The shaft

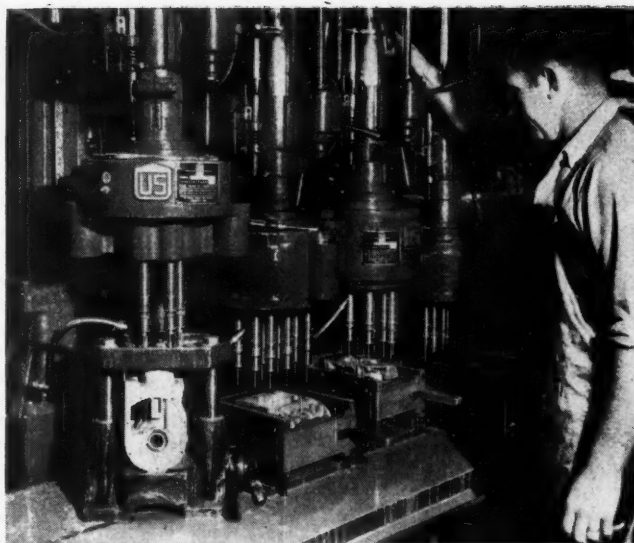
side is removed, bringing the finished diameter of the bearings to 0.998 inch, plus 0.0005; minus 0.000 inch.

The cover and side plate holes in the power head are tapped in the machine shown in operation in Fig. 4. This machine is a Fosdick drill press, equipped with "U. S." tapping heads. Using this equipment, the operator taps ten  $\frac{1}{4}$ -inch, 20-thread holes for the cylinder head, eight No. 10, 24-thread holes for the exhaust port plate, ten No. 10, 24-thread holes for the bottom and water seal, and eight No. 10, 24-thread holes for the intake port plates. Each one of these groups of holes is tapped complete in one operation. With quick-operating fixtures, the operator is able to synchronize his work so that he is able to keep all four spindles busy.

In Fig. 5 a power head is shown set up on a Morey turret lathe so that the bearing on the end of the piece for the



Fig. 4—With the aid of U. S. drill heads applied to the spindles of a Fosdick four-spindle drilling machine, this operator drills and taps the side plate holes in the power head.



stator plate can be turned and faced. In chucking the piece in the fixture, the location is taken from a crankshaft bearing hole. In order to assure accuracy in locating, chucking and machining the piece, a cylindrical arbor, held in the turret and finished to within 0.001 inch of the bearing diameter, is passed through the main bearing and the end inserted into an Oilite bushing in the spindle nose. Thus supported, the stator plate bear-

ing is finished to within 0.0005 inch of the specified dimension and concentricity.

The operations of boring the valve guide holes and facing the valve seats in the crankcase are performed in the Fostick four-spindle drilling machine shown in operation in Fig. 6. Correct locations and angles are assured by the use of jigs, as shown.

An interesting feature of this job is the manner in which dial indicators are used to control the tools in order to obtain

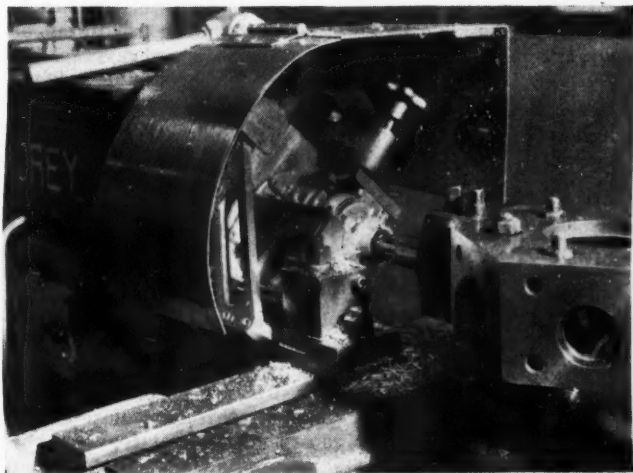


Fig. 5—Turning and facing the stator plate fit on the power head.

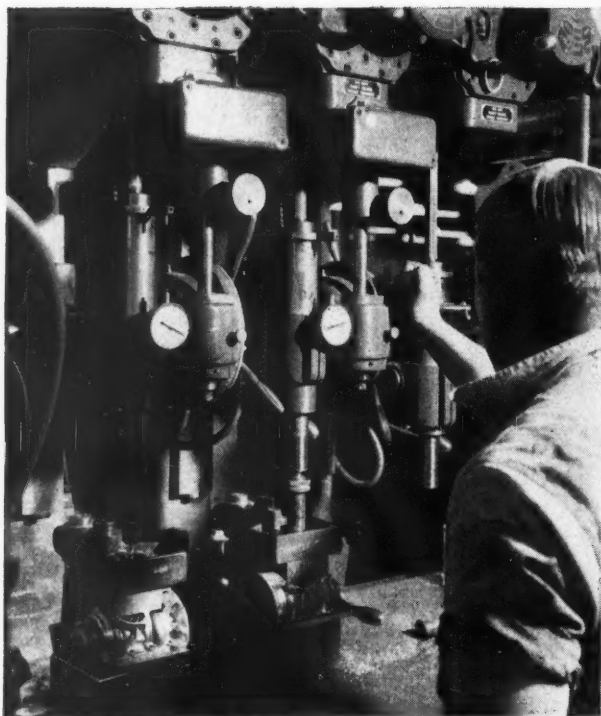


Fig. 6—Boring the valve guide holes and facing valve seats in the crankcases. Note the drill-depth indicators on the machine spindles.

the correct depth of the valve seat. An indicator is attached to the spindle support in such manner that the feed-trip mechanism on the machine is in line with the spindle of the indicator. When the tool has fed down until it is within a few thousandths of the correct depth, the trip engages the indicator spindle. The indicator having been pre-set, the operator can see exactly how much stock is to be removed and can trip the feed when the correct depth has been reached. With this equipment the valve seat depth is held within a tolerance of 0.001 inch.

An interesting piece of equipment is shown in use in Fig. 7. Using a Delta drilling machine equipped with a "Quadrill" turret, the operator is processing a front motor support tube housing. The operation consists of

drilling and tapping a swivel bolt lock screw hole, which takes a  $\frac{3}{16}$ -inch screw, and drilling a  $\frac{1}{2}$ -inch hole for a swivel lock pin. The turret is indexed rapidly from one position to another, and as each auxiliary spindle is moved into working position it is immediately engaged by the machine spindle and is thus ready for work. The simple movement of indexing a tool out of working position disengages it again.

The tap is held in a Procunier tapping head, which revolves the tap to the right so that the teeth will cut as it is fed into the work and reverses the tap immediately as the spindle is lifted to withdraw the tap from the hole.

The two piston bores in each cylinder are rough machined in the Bausch multiple drill shown set up in Fig. 8. To ensure perfect alignment of the boring bars and thus be able to work to closer accuracy, a fixture is used that has been made from a Danly die set. The die is so designed that the top, or jig-plate, is held in perfect alignment with the bottom, or locating plate, by the use of guide posts which are anchored in the bottom plate and which project through close-fitting bushings in the upper plate.

The bars for the roughing operation

are standard bars to which Ampco bronze strips have been added to take the brunt of the wear. The finish boring tools are Barber-Colman cylinder reamers which were especially designed for this operation. Each reamer has eight blades of left-hand spiral design. Two cuts—rough and finish—are taken through the bores prior to honing. The tools for both roughing and finishing are equipped with tungsten carbide tips to aid in maintaining size and to prolong the life of the blades between grinds.

The cylinder castings come to the machine with approximately 1/16 inch of stock to be removed from the bores, of which about 0.050 inch is removed in the roughing operation. Operating at a speed of 600 r.p.m., with a feed of 0.036 inch per revolution, approximately 0.011 inch is taken out in the finish reaming operation and 0.0015 inch is left to be removed by honing.

The last operation on the finishing of the cylinder bores is the honing operation, which is performed as shown in Fig. 9. A double fixture, designed to slide horizontally to the right or left, as required, is set up on a Barnesdril vertical honing machine and one piece is processed while the operator is changing the other. When the fixture is moved to the right against a stop, one workpiece is in alignment with the machine spindle; when the fixture is moved to the left, the other workpiece is in position for honing.

Using a Micromatic hone, the 0.0015 inch of stock is removed from the bore in approximately 20 seconds, finishing the bore to within a tolerance of 0.0005 inch for diameter and within 0.0002 inch on the taper and out-of-round.

To keep the stones cool and assist in the honing action, the hones are flooded, during the operation, with a fine grade of coolant. The coolant not only keeps the stones cool but also washes away the masses of fine iron chips and abrasive dust which otherwise would clog the stones and materially reduce the quality of the finish.

Under ordinary conditions the coolant becomes so impregnated with the fine chips and abrasive that a large percentage of the waste material is returned to the work, defeating the purpose for which the coolant was intended. To eliminate this condition, the honing machine shown here was

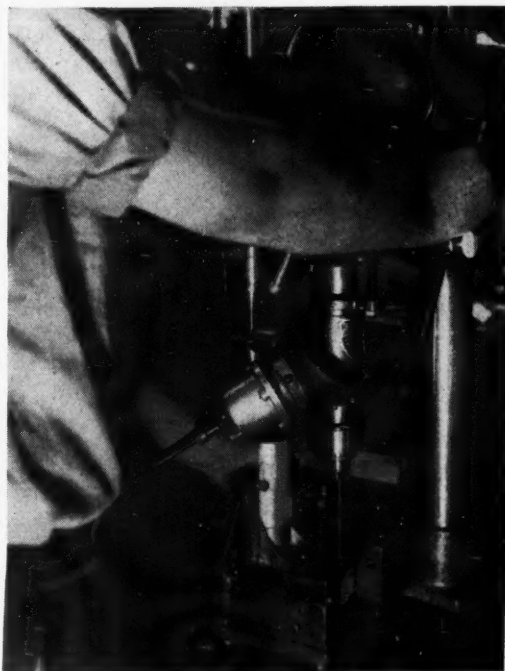
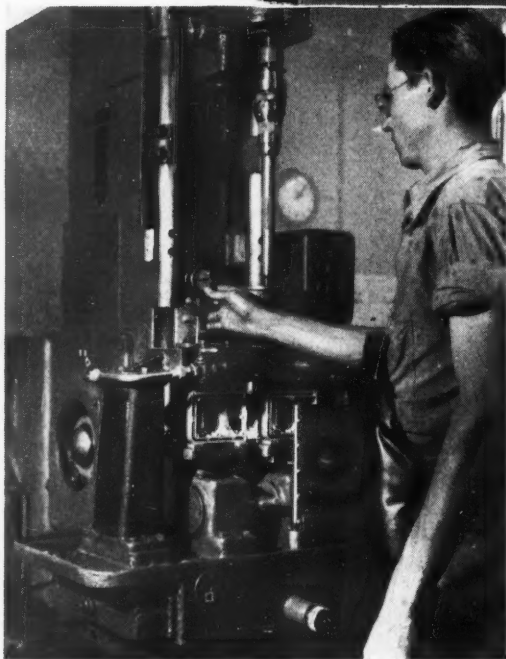
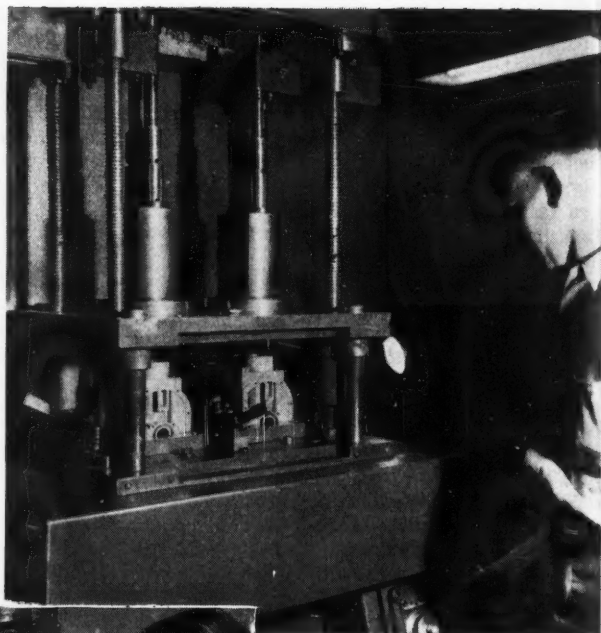


Fig. 7—By adapting a "Quadriil" unit to this Delta drill press, three operations can be performed in quick succession.

Fig. 8—Machining piston bores in cylinders. The fixture is made from a Dandy die set, which is perfect for the purpose.

equipped with a Barnes magnetic coolant separator which performs the function of removing all the waste matter from the coolant.

The principal operating member of the Barnes magnetic coolant separator is a drum built with a series of permanent magnets mounted around the inside of

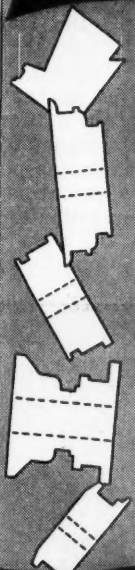


the periphery and rotating with the drum. The outer periphery of the drum is faced with a sheet of non-magnetic material through which the magnets attract and hold the magnetized swarf and chips, including most of the abrasive waste. As the drum slowly revolves, all of this sludge is continuously and automatically scraped off and discharged into a receptacle, from which it is later removed. The clean coolant flows into a storage tank, from which it is returned

Fig. 9—The piston bores are finished by honing in this Barnes vertical honing machine.

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Fig. 10—Each "Martin 60" is given a thorough work-out and complete inspection before being OK'd for shipment.

a standard plating tank equipped with steam coils, and an electric immersion heater is used to "boost" the temperature to the required point.

to use on the machining operation.

By removing the chips, dirt and abrasive waste from the coolant by means of the separator, the coolant can be used for a much longer period of time before replacement becomes necessary, and an important saving is made in the wear on the tools as a result of the continuous use of clean coolant.

In the assembling of the motor, it is interesting to note that the lower gear housing and power head are fitted with Oilite bronze bearings which have been impregnated with oil. The bearings are boiled in oil for 20 minutes at a temperature of 240 deg. Fahr., both to assure freedom from moisture and to assure complete saturation with oil. In the boiling process the bearings pick up 30 per cent of their own weight in oil. The oil is heated in

Upon completion of the assembly, each motor is given a thorough test under conditions designed to duplicate normal service as far as possible. Included in this work-out is a "water test" with the propeller immersed in water in exactly the same manner in which it would be immersed in actual

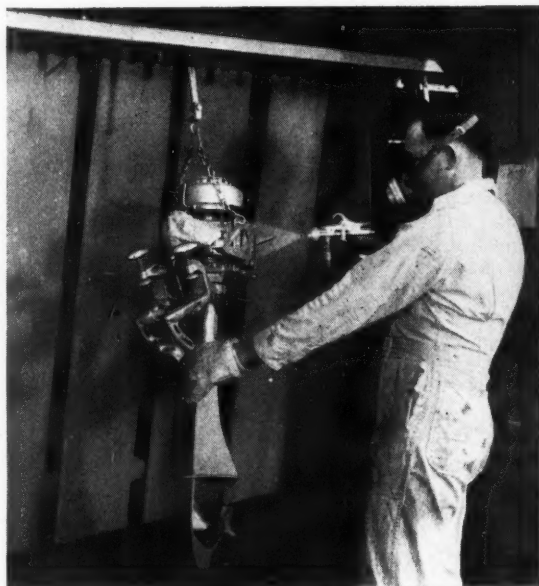


Fig. 11—The finishing touches are applied with a spray gun, as shown here.



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April, 1947

MODERN MACHINE SHOP 133

use, as shown in Fig. 10. Here a number of motors are shown set up in line in a huge tank which has been filled with water to the normal depth for outboard motor use, and each motor in turn is operated at the various speeds to which it will be subjected in service. Each motor must show a tachometer reading of 3,500 r.p.m. or over after having been subjected to a continuous running-in test for approximately 45 minutes.

Upon completion of the running-in test, each motor is examined for loose

screws or defective assembly. After the necessary adjustments have been made, the motor is conveyed through a wash operation and is then ready for the application of the finish. Suspended from an overhead power conveyor, the motor is conveyed into the paint booth shown in Fig. 11, where it is given a final coating of protective and decorative enamel. The tank and starter assembly are assembled to the motor, it is given a final inspection, and the "Martin 60" is ready to serve faithfully its prospective owner.

### "Basic Criteria Used in Wage Negotiations"

"Labor has little opportunity to raise its compensation at the expense of corporate profits," Sumner H. Slichter, Lamont Professor, Harvard University, declares in a study prepared for the Chicago Association of Commerce and Industry. "The share of the national income going to property is so small that even if employees could expropriate all of this income without adverse effects upon employment and production, the rise in the average standard of living of employees would be small. Corporate payrolls in 1944 were nearly seven times as high as corporate profits after taxes."

It does not follow from this, however, that the outlook for a rapid rise in real wages is dark," according to Dr. Slichter. "For over two generations," he says, "the number of physicists, chemists, engineers and other technicians has been increasing from 10 to 14 times as fast as the working population. Expenditures on industrial research have also been growing by leaps and bounds. Both of these trends seem bound to continue. Expansion of research by one enterprise forces expansion by its competitors. Furthermore, the upward pressure of unions on wages will stimulate the increase in industrial research. If the number of technicians and the expenditures on research continue to grow faster than the working population, the country should be able to achieve a rapid rise in output per man-hour."

Dr. Slichter's study, entitled "Basic Criteria Used In Wage Negotiations," lists seven standards which are commonly considered in wage negotiations and analyzes the economic effects of the application of these standards. The criteria are as follows:

1. Minimum family budgets.
2. Changes in cost of living.
3. Maintenance of take-home pay.
4. Changes in productivity.
5. Ability to pay.
6. Effect of wage changes on consumer buying power.
7. Comparison of wages in different localities, industries, or plants.

Among the conclusions Dr. Slichter reaches are that the establishment of a minimum wage determines the standard of employability which workers must meet to get or hold jobs; a policy of raising all wages to compensate for a rise in living costs would be self-defeating; low wages are not a competitive menace when they are a result of low productivity and do not produce low labor costs; the economic consequences of basing wages upon ability to pay would be very unfavorable; if the cost of living were the same in all places, there would still be good reasons for geographical wage differentials.

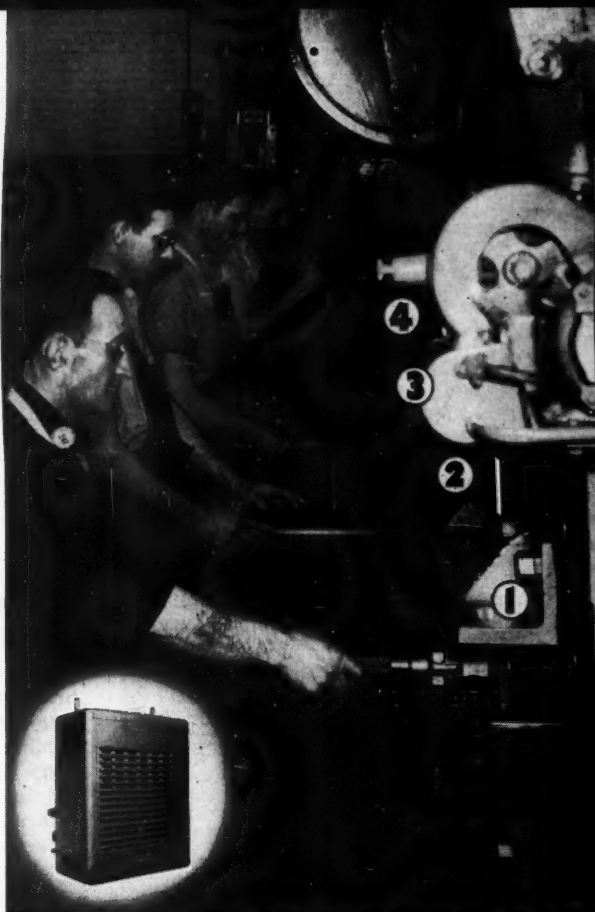
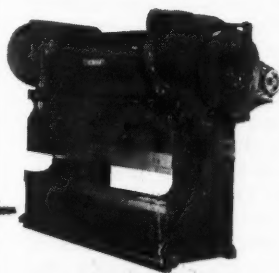
In announcing publication of the study, Leverett S. Lyon, chief executive officer of the Association, said, "Never before in the history of the United States have the questions of sound wage adjustments been as significant as now. It is important that negotiations be carried on by all parties concerned with as full a realization as possible of the economic implications of the matters under discussion and of the decisions reached."

Copies of "Basic Criteria Used In Wage Negotiations" can be obtained from the Chicago Association of Commerce and Industry, 1 North LaSalle Street, Chicago 2, Illinois, for 50 cents each.

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# Maintenance Metallizing

## Versatility of the Process—Surface Preparation—Techniques of Spraying

By GILBERT C. CLOSE\*

**T**HE practical aspects, value, and various economies of the metallizing process in salvage, maintenance and repair work were brought forcibly

to the attention of American industry during the lean years of World War II. When new machine tools were impossible to obtain without high priority ratings, when even replacement tool elements required long waits that threatened production schedules, the value of a process that would make possible the repair and salvage of many worn parts in a matter of several hours could not be measured in dollars and cents.

Furthermore, after adopting it as an emergency measure, tooling engineers discovered that metallizing was not only highly practical, but offered many economies and advantages that would vindicate its use under normal peacetime conditions.

The greatest overall advantage of the process is its extreme versatility. A large part of this versatility is due to the numerous types of metallizing wires available. These run the gamut from the light metals, through various brasses and bronzes, most grades of carbon steels, the stainless steels, and specialized metals such as Monel, bab-bitt, and alloys designed for specific purposes.

\* During the recent war Mr. Close was in charge of the metallizing work at the El Segundo Division of Douglas Aircraft Company.

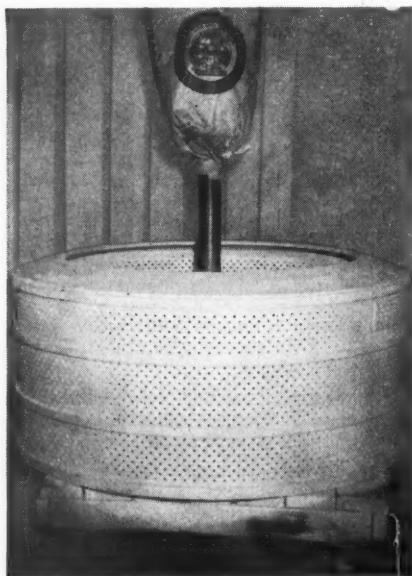


Fig. 1—This large rotary drier has been sprayed with zinc to prevent corrosion; a good example of the type of service that can be rendered with metal spraying equipment.



Fig. 2—Finish grinding metal-sprayed skirt of 76-inch marine piston. New piston would have cost \$1750 plus \$10,000 layover cost to ship owners. Old piston was salvaged by metal spraying process in 33 hours. (Photo courtesy Metallizing Company of America.)

Though metal spraying equipment is purchased with an eye to machine tool element salvage only, any wide-awake maintenance man will soon find the metallizing gun serving other shop needs as well. These off-trail jobs might include such projects as applying a protective coating of aluminum or zinc to a steel storage tank, refacing a worn Kirksite die with lead, spark-proofing steel to be used in the vicinity of explosive chemicals by spraying it with a non-sparking metal, or increasing the heat resistance of a gas burner by spraying it with aluminum. The fact that sprayed metal can be applied to wood, fiberoid, glass, concrete, plaster, ceramics, leather, and other materials will lead to other uses as familiarization with the equipment progresses.

Insofar as machine element salvage is concerned, the principal advantages of a metal sprayed coating are its extreme wear resistance, inherent self-lubricating properties, and the fact that a part can be rebuilt and returned to service within a short time. A further advantage is that extensive experience is not required to manipulate the metallizing gun; any competent workman, after a few hours of practice, can turn out acceptable work.

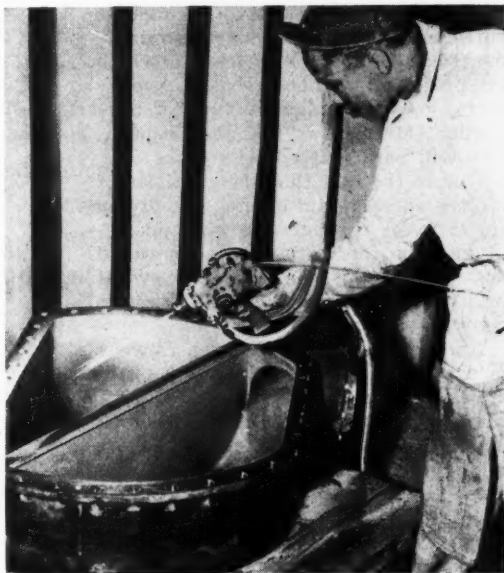


Fig. 3 — Spraying a bronze water chest with solder to prevent corrosion and to prevent possible leakage.

Of course there are fundamental requisites that must be carefully followed to obtain good results consistently. These include proper cleaning

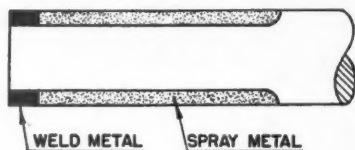


Fig. 4—Drawing of rebuilt shaft end, showing method of rebuilding by use of welded metal ring to prevent edge shearing of spray metal.

of the work, proper surface preparation to obtain a good bond, recognition of process limitations, and proper choice of final finishing techniques.

A short discussion relative to the metallurgical characteristics of sprayed metal will aid materially in clarifying certain process requirements. Most important in this conjunction is the fact that a sprayed coating adheres by mechanical bond and does not fuse with the surface to which it is applied. The work surface must be sufficiently rough to provide numerous small irregularities around which the projected particles of molten spray metal may key and anchor as they harden. Methods of surface preparation will be discussed later.

Due to the fact that the particles of molten spray metal quench rapidly as they travel through the air and impinge upon the work surface, sprayed coatings are very hard and somewhat brittle in character. This hardness is contributory to wear resistance.

Another factor which increases wear is the inherent self-lubricating properties of a sprayed surface. During their travel from a gun nozzle to work surface, each molten particle gathers a slight oxide film. These oxide inclusions in the sprayed coating result in slight porosity and, during subsequent service, oil will become absorbed in these pores just as it is absorbed

by a sintered bearing. Thus a continuous oil film is provided at all times, both during operation and when starting with a static load. Also, the absorbed oil will provide lubrication for a considerable period after the lubricant supply has been exhausted.

In laboratory tests, Diesel engines with metallized bearings and crankshaft journals have been operated continuously for 20 hours after all oil was drained from the crankcase. This was possible, of course, after the sprayed metal had been immersed in oil long enough to fill all pores.

Its brittleness, and the fact that adherence is by mechanical bond only, places definite limitations on the use of sprayed metal. It cannot be employed where the coating will be subjected to tensile stresses of any type. Also,

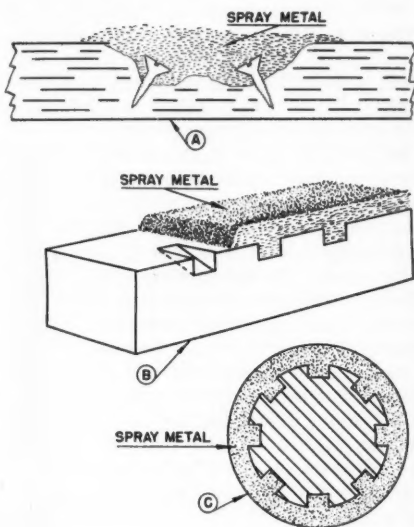


Fig. 5—Drawing illustrating various ingenious methods employed to increase bond strength of sprayed metal. (A) Screw inserts with protruding heads, used when deep path must be applied to flat surface (B) Ground notches will provide additional edge strength. (C) Notches in shaft end provide additional bond strength when shaft end is not sufficiently stressed to require a ring of weld metal as shown in Fig. 4.



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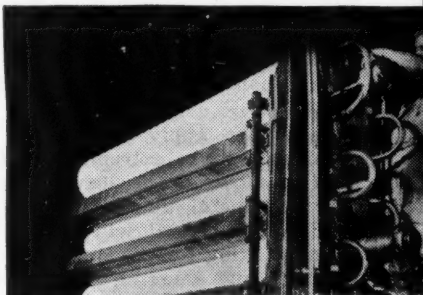
In helping you find solutions to problems in any of these fields, Sun Oil Company offers a wide selection of "Job Proved" petroleum products, plus the experience of Sun Engineers. Detailed product information and the know-how of Sun's engineers are yours for the asking, without obligation. Telephone your local Sun office, or write Dept.MM 4. . .

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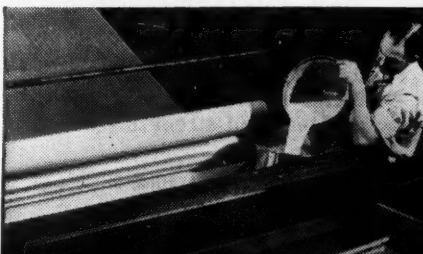


**ALUMINUM PARTS MANUFACTURER** increased production 43% by using a Sun cutting oil.



**PAPER MILL** slashed annual lubrication bill \$2874 by using a Sun Grease.

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the shear strength of an unsupported coating is relatively small, and the coating should not be applied on edges that are to be subjected to severe shearing stresses.

When building up the journal end of a worn shaft, for instance, it will be



Fig. 6—Repairing a ram from a large hydraulic press by spraying with stainless steel. (Photo courtesy Metallizing Company of America.)

necessary to apply a ring of weld metal around the extreme end of the shaft as shown in the drawing Fig. 4. This weld metal, due to actual fusion with the base metal, will provide sufficient backing for the spray metal to eliminate any shearing tendencies. It should be noted at this point, however, that when provided with sufficient backing support, the compressive strength of sprayed metal is very great. This has been proved by use of the process for rebuilding worn hydraulic and press rams subjected to loadings of many tons. Figure 5 illustrates several methods for obtaining greater bond strength when required,

and for reinforcing sprayed deposits along free edges.

There are four definite steps to most metallizing jobs, including cleaning, surface preparation, metallizing, and finishing. When the part is further prepared as illustrated in Fig. 4 or 5, this constitutes a fifth step, and must be accomplished first. Cleaning, surface preparation, and final machining or finishing will vary sharply with the kind of work involved, the spray metal used, and dimension tolerances of the salvaged part.

All surfaces to be sprayed must be thoroughly clean. Dirt of any type constitutes an inclusion which will materially affect the bond strength of the spray metal. Oily or greasy parts may be cleaned in a conventional alkaline cleaning solution or vapor degreaser; parts too large for immersion in cleaning tanks may be wiped clean with a rag saturated with carbon tetrachloride. In the case of heavy grease deposits, pre-cleaning will speed the final cleaning process and will aid in preventing undue contamination of the cleaning solution.

Porous castings that have been in contact with grease or oil for a considerable period may have to have the grease removed from the pores by pre-heating to approximately 400 deg. F. in an oven, following with a thorough surface cleaning. In certain instances, where the dirt consists of furnace scale, rust, and similar surface oxides, pickling must precede cleaning. If pickling facilities are not available, light sand blasting will remove such dirt. In certain instances and with certain parts, especially irregularly-shaped light metal parts, this sand blasting operation will produce a sufficiently rough work surface to provide a spray metal bond. It is not wise, however, to attempt sand blasting parts that are covered with gummy, wet or oily surface contaminates.

More metallizing failures result from improper surface preparation

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### FROM LUBRICATION ENGINEER'S REPORT

"A mining company\* in the Joplin area was having trouble with the unloading valve on an Angle Compound Air Compressor. They were also troubled with discharge valve breakage of the high pressure cylinder.

"The previous oil was replaced with Cities Service North Star Oil No. 5 and

not a single instance of gumming or sticking or trouble of any kind with the unloading valve or discharge valve has been reported in over two years."

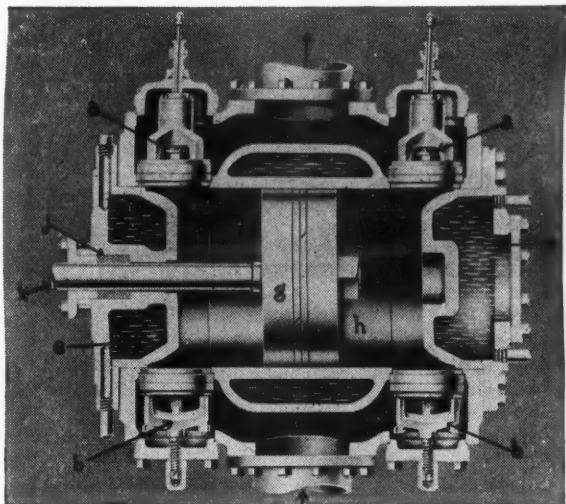
"A utility plant\* in Springfield, Mo., uses compressed air from a single stage belt-driven air compressor in connection with overhauling jobs of the boilers in

their plant. They are all of the water tube type and are overhauled at regular intervals. During these overhauls they need a constant supply of air. The unloading valve of this compressor would gum up to the extent that they would have to clean it about every other day when using a competitor's oil. I sent them a drum of Cities Service North Star Oil No. 5 about a year ago, and checked with their Chief Engineer last month.

He tells me they haven't had to clean the unloading valve since putting in the North Star Oil."

Solving compressor operating problems has been our forte for years. A phone call or card to the Cities Service office nearest you will bring this engineering experience to your plant. There is no obligation. Write for our free booklet, "Air Compressor Lubrication." Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y., Room 60.

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Fig. 7 — Rebuilding a piston for a huge Diesel engine, using two metallizing guns simultaneously to speed the operation.

than from all other faults combined. The surface must not only be rough, but the minute irregularities must be of a jagged nature. The right degree of roughness is easily obtainable when recommended techniques are followed.

There are three commonly-used methods of surface preparation; i.e., (1) sand- or grit-blasting; (2) rough threading; (3) electric bonding. Blasting is generally employed on irregularly-shaped parts or structures that cannot be mounted and rotated in a lathe. Smaller parts may be blasted in a conventional cabinet or blasting chamber, while large structures to be protectively coated will require some sort of portable blasting equipment.

A good grade of angular silica, flint or garnet sand, of 16 to 20 mesh size, will work well on the light metals or on large sheet metal structures subject to warpage during blasting. Used with a  $\frac{1}{8}$ -inch air nozzle and at 60 pounds air pressure, this abrasive will produce good results.

The blasting nozzle should be held

necessary for best metallizing results. When sand is used, it should be cleaned between applications to remove dust and foreign matter and it should not be employed for more than three successive blasting operations.

In general, steel grit will give better results than sand, and will prove cheaper in the long run. While sand is limited to three blastings, steel grit may be used from 90 to 100 times before it is worn to the point of uselessness. Also, grit will cause less dust and does not require extensive ventilating equipment.

An **angular** variety of grit should be chosen. A 50-50 mixture of No. 30 and No. 40 has proved very satisfactory for most types of machine element work. On heavy work, grit size may be increased to No. 15 or No. 20. A  $\frac{3}{8}$  or  $\frac{1}{4}$ -inch air nozzle should be used, with air pressures ranging between 80 and 100 pounds. Here again the abrasive should be directed vertically against the work surface. When very thin sheet metal structures must be blast-

from 10 to 12 inches from the work, and the abrasive should be directed perpendicularly against the work surface. When the abrasive strikes the work surface at an angle, it will clean but fail to produce the degree of roughness

# "Arc Booster" Simplifies AC Welding

Lincoln Electric announces new industrial type AC welder

A NEW heavy-duty transformer type welder, the "Fleet-Arc" has been introduced by The Lincoln Electric Company which improves AC welding by affording greater ease of arc striking, deeper penetration at the start, wider range of output, greater economy of operation and greater safety. It is applicable to a wide range of applications throughout industry.

A feature known as the "Arc Booster" gives the arc a burst of current the instant the electrode touches the work, starting the arc automatically. The current then returns in a fraction of a second to the amount set for the job. A selector switch provides adjustment of the booster current for any degree of arc striking intensity to suit the job.

## Improves Penetration at Start

To improve penetration at the start of a bead, the "Arc Booster" of this new welder can be set to dig in with deep penetration. This is especially important for tack welds and short beads.



## Improves Arc Characteristics

The welder has a reactor type of control which is a free circuit, designed for high responsiveness to changing arc conditions. It is separate from the main transformer which is designed for high efficiency. This design gives high arc sensitivity for maximum ease and speed of welding under all conditions; it makes possible an exceptionally wide range of output; and it improves power efficiency.

## Current Adjustment is Continuous

The rotating reactor control provides step-less, smooth, accurate adjustment of welding current over the entire range of the welder. The operator simply turns a hand wheel. A double reduction chain drive makes it easy to turn the control and requires a minimum number of turns of the handle to cover the range. The amperage is indicated on a dial on the front of the welder.

The reactor current control is held in position by rugged cone brakes, preventing vibration and wear of the control mechanism.

## Increases Safety

The open circuit voltage of the "Fleet-Arc" AC welders never exceeds 63 to 70 volts (depending on welder capacity). This eliminates the hazards of the high open circuit voltages which are used in the usual AC welders to improve arc striking.

## Reduces Idle Power Consumption

The independent control circuit eliminates the need for high open circuit voltage, contributes to higher power factor. By reducing amount of condensers needed as much as 66%, this new welder minimizes idle power input.

## Is Completely Self-Protected

A thermostatic device protects the windings of the welder from damage due to overheating, opening the welder's magnetic starter under such conditions. This feature permits the welder to be used at high current values for sustained periods without danger of burn-out.

## Immediate Delivery

The new welders are available from stock in ratings of 200, 300 and 500 amperes. Complete information on the "Fleet-Arc" AC Welders is given in Bul. 366 which may be had by writing The Lincoln Electric Company, Dept. 302, Cleveland 1, Ohio.

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ed, a No. 60 grit and 60 pounds air pressure will eliminate danger of warpage. The air used in all blasting equipment should be filtered, and the

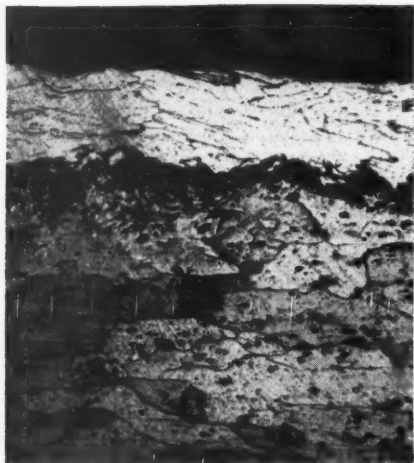


Fig. 8—Microphotograph of pure aluminum sprayed onto 24ST aluminum alloy. Note porosity of sprayed coating and roughened surface of base metal to provide mechanical bond.

airlines must be kept free of oil and moisture.

Work should be metallized as soon as possible after blasting. This precaution will prevent rust and other surface oxides from forming on the freshly blasted areas. Clean gloves should be used in handling parts from the blasting chamber to the metallizing room.

The second method of surface preparation—rough threading—is widely employed on small cylindrical parts that cannot be mounted and rotated in a lathe. The general run of work of this kind will include pistons, shafting, pump plungers, rolls, crankshafts, cylinders, journals and bearings, and similar components. In fact, in machine element salvage work, rough threading will probably be employed

more often than either blasting or electric bonding.

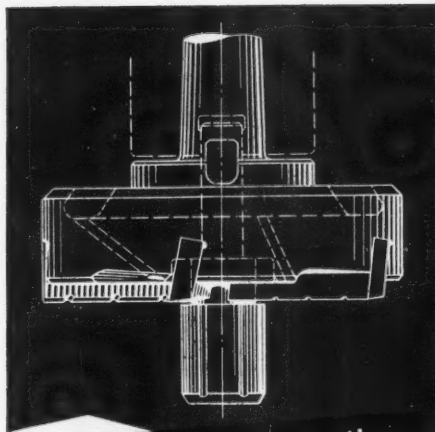
Rough threading should be accomplished prior to cleaning, as grease and oil are bound to accumulate on the part during this operation. In some instances, the part to be rebuilt may not be worn enough to allow a sufficient thickness of spray metal for best results. The spray metal coating should be at least  $1/32$  inch thick, and even thicker where heavy wear is anticipated. When this condition exists, it will be necessary to reduce the diameter of the part so that a coating of the desired thickness may be applied.

The tool used in producing the rough thread is ground in such a manner that it has a tendency to tear rather than cut a clean thread. Any experienced machinist can produce a tool that will accomplish this result, especially if he is willing to experiment on scrap until the right degree of roughness is obtained.

The tearing action of the tool will be increased by setting it from  $1/16$  to  $1/4$  inch below the axis of the work, depending on the work diameter. Also, slow rotation of the work will aid in producing the dragging effect necessary for best results. The surface speed of mild carbon steels should not exceed 40 ft. per minute, and alloy steels should rotate somewhat slower.

The thread should be formed in one traverse of the cutting tool. Twenty-four threads per inch on work one inch or less in diameter, and 16 threads per inch on larger work, is recommended. If the tool is set to cut slightly deeper than the depth for which it is ground, the apex of the thread will be slightly torn and will thus produce additional roughness. After the thread has been cut, protruding burrs should be removed, using a square-end bit set so it just misses the top of the threads. Such burrs, left intact, will result in a rough finish after spraying.

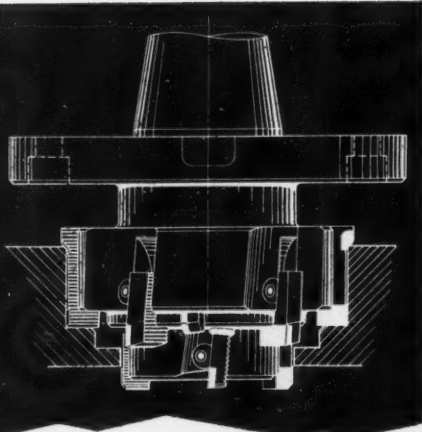




## Put Teeth into Production

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Greater rigidity increases their ability to take heavier feeds. They provide solid, positive, independent support to the blades which may be of high speed steel, hard alloys, or tungsten carbide. Blades are designed with correct angle, positive or negative rake, and proper projection of the blades from the body. They

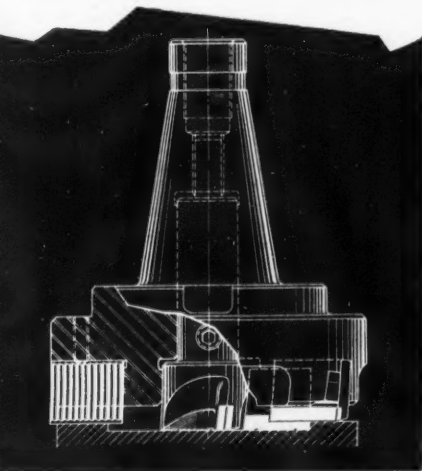
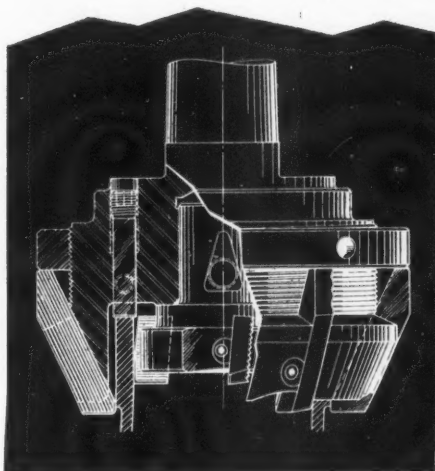


are replaceable at a fraction of the cost of solid tools.

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Our Engineering Department will gladly discuss any heavy cutting tool problem you have.

**THE GAIRING TOOL COMPANY, DETROIT 32, MICHIGAN**



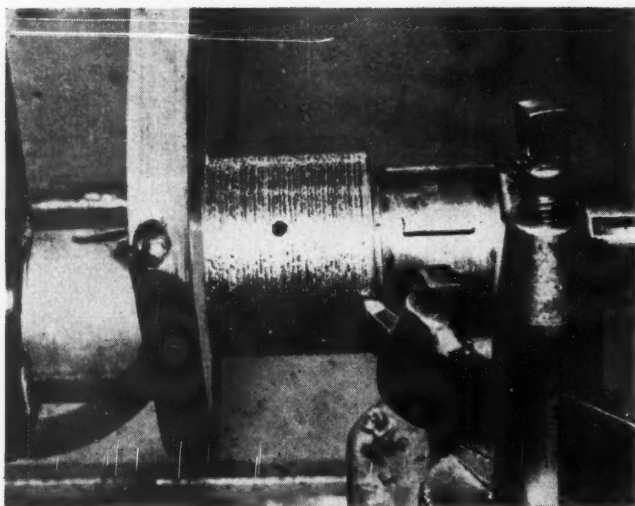


Fig. 9 — Roughing a journal surface with a threading tool prior to metallizing. Note torn nature of threads. (Photo courtesy Metallizing Company of America.)

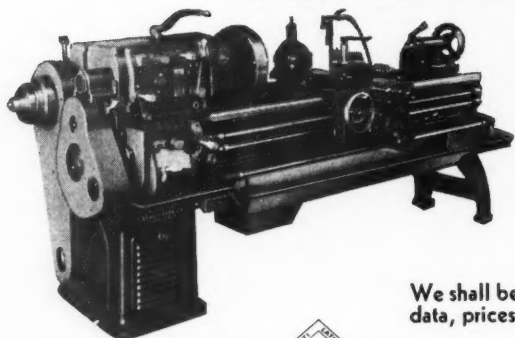
There are available on the market several types of knurling tools that can be used to produce the necessary roughness on cylindrical workpieces

vantage in speed and convenience over conventional rough threading, and are probably worth while when a considerable amount of machine element

that are to be sprayed. These tools are mounted in the lathe in the same manner as a conventional cutting tool, and the surface of the work is knurled as it rotates. They afford a slight ad-

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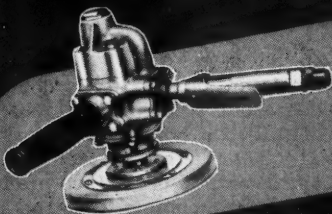
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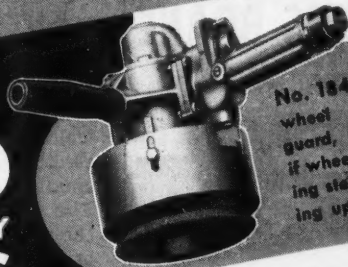
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378



No. 1460, fitted with pad for abrasive discs. So made it is widely used in auto body and metal furniture plants.



No. 1845 fitted with abrasive wheel and adjustable wheel guard, which protects operator if wheel breaks. Used for surfacing steel sheets and bars, cleaning up welding operations, etc.



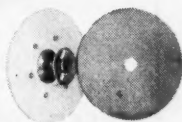
No. 1460, fitted with cup wire brush (supplied at extra cost) for removing rust, scale, paint from metal surfaces preparatory to repainting.

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✓ polishing  
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1845	4300 R.P.M.	12 lbs.	5"	6 1/2"
1860	5800 R.P.M.	12 lbs.	9"	10"
1460	5800 R.P.M.	8 1/4 lbs.	7"	4 1/2"
1480	8000 R.P.M.	8 1/4 lbs.	7"	4 1/2"

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salvage is anticipated. It is doubtful, however, that the knurling tool will provide a better bonding surface than a good job of rough threading.

A third method of surface preparation—electric bonding—may be used on large or small irregular or cylindrical shaped elements. The electric bonder is very similar to the electric welding torch in operation. A nickel electrode or brush composed of many small nickel electrodes is employed. The electrode is wiped swiftly across the surface of the work, in the process of which small portions of it arc away and fuse with the work surface. These tiny fused bits of electrode metal are very jagged and rough, and offer excellent anchoring points for the spray metal. Furthermore, heat produced by the arcing is so localized and dissipates so rapidly that it does not affect the temper of the metal in the work-piece.

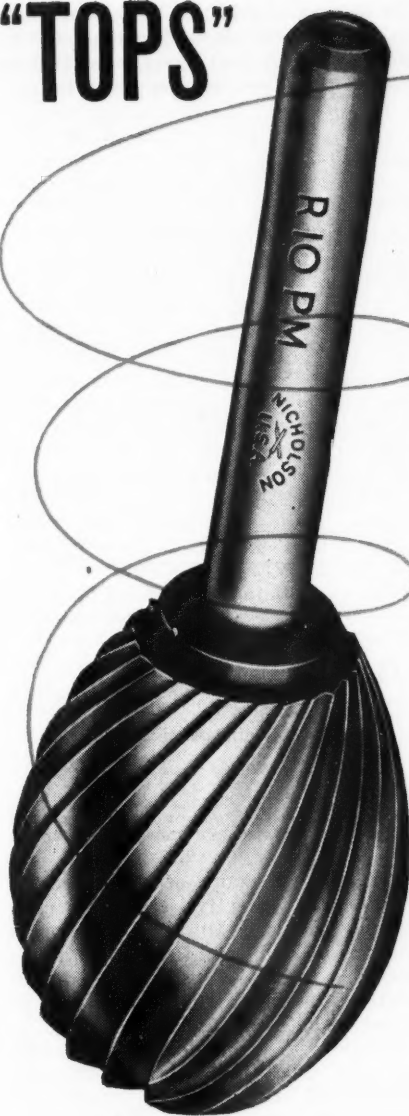
The electric bonder has proved very successful in all types of metallizing work, the only objection being the additional expense incurred by its use. Insofar as the author is aware, electric bonders are not for sale, but must be leased from the manufacturers of metallizing equipment on a per diem, weekly, monthly or annual basis.

Techniques employed in application of the spray metal will vary considerably with the type of work involved. Metallizing gun adjustments should be made in accordance with the manufacturer's directions. Either oxidizing or reducing gas flames should be avoided; an oxidizing flame will result in undue oxide inclusions in the coating, while a reducing flame will result in rough and generally inferior work.

In spraying large structures or irregularly-shaped parts, the gun will usually be hand-manipulated. The nozzle should be held 6 to 8 inches from the work surface and should be kept in constant motion. An even, uniform movement of the gun will eliminate

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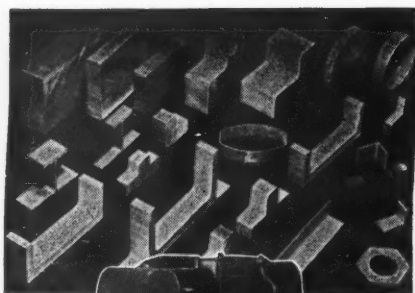
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the danger of overheating, and will aid in securing the desired coating thickness. As most coatings applied in this manner will not subsequently be fin-

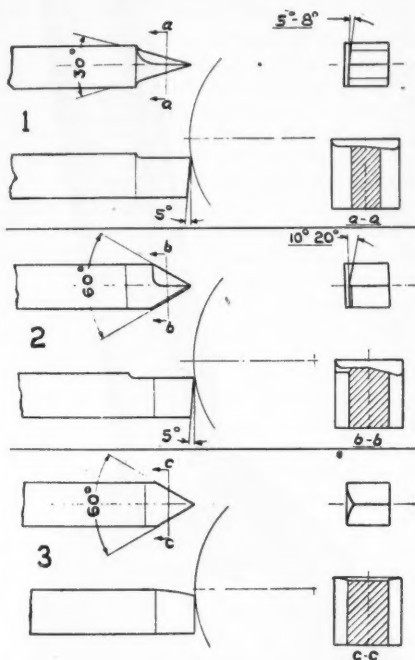


Fig. 10—Drawings of toolbits that have proved successful in rough threading operations.

ished, and as many of them are intended as protective coatings, care should be used to meet minimum thickness requirements. Due to the inherent porosity of sprayed metal, a coating that is too thin will prove ineffective as a protective medium.

Protective coatings of aluminum and zinc should be at least 0.020 inch thick, and lead coatings should be somewhat heavier, ranging between 0.025 and 0.030 inch. An inexperienced operator can apply coatings within narrow tolerance limits by experimenting on test panels prior to actual spraying. He should measure the



thickness of the panel with a micrometer, then apply several ribbons of spray metal, using the same gun speed that will be employed during spraying. A second measurement of the panel divided by the number of gun passes will indicate the thickness of metal applied during each pass.

It should be noted, however, that the ribbon of spray metal laid during each pass tapers thin near the outside edges, therefore it is recommended that the ribbons be overlapped approximately one-third to keep overall thickness tolerances equal.

In spraying cylindrical workpieces mounted in a lathe, general practice is to mount the metallizing gun on the carriage of the lathe and traverse the gun while the work is rotating. Surface speed of the work will depend upon the thickness of spray metal to be applied, and whether or not the entire coating thickness is to be applied in a single traverse of the gun. Opin-

ions vary on this point, and all have successful adherents.

Some operators start at one end of the prepared surface, build up the coating to the predetermined thickness, then move the gun along an inch or so and repeat the operation until the part is completely coated. Other operators apply successive coatings, each from 0.010 to 0.020 inch thick. Most operators, however, adjust the longitudinal feed of the gun and speed of the work so that the required thickness of coating is applied in a single continuous operation. This latter practice eliminates the danger of layer separation, and is recommended by the author except where unusually thick coatings are required.

As a rough guide in this conjunction, a gun that will spray  $6\frac{1}{2}$  pounds of steel per hour will apply a coating 0.090 inch thick when the surface speed of a 3-inch shaft is 20 ft. per minute and the longitudinal feed of

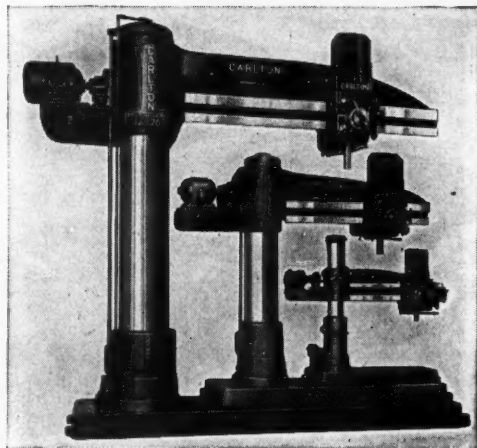
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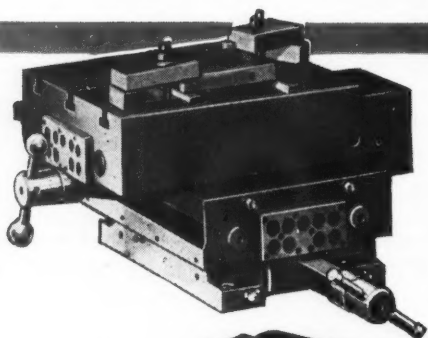
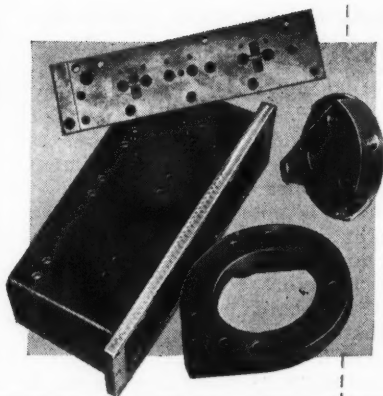
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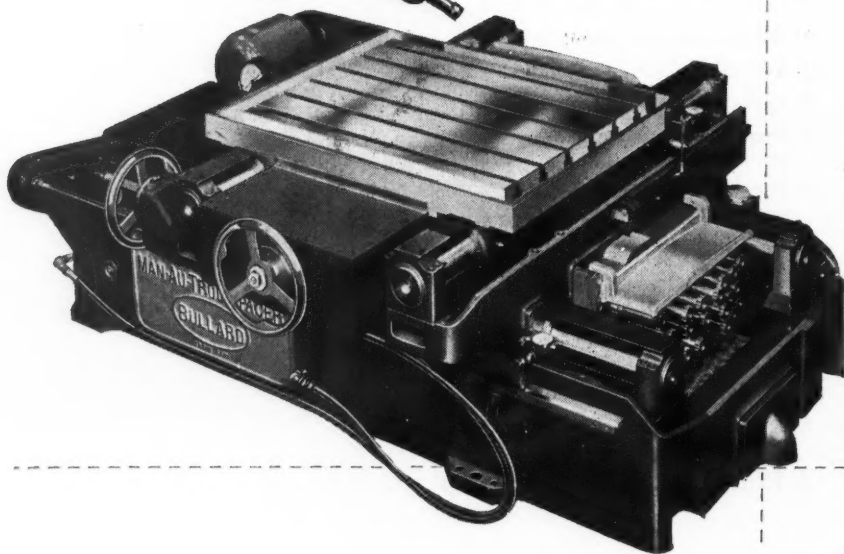
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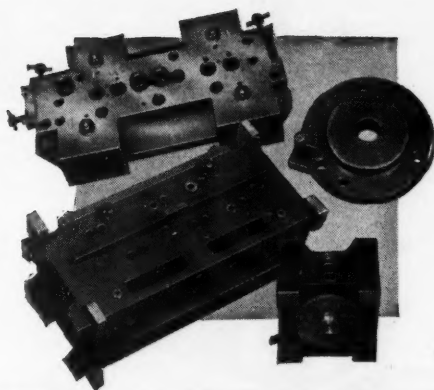
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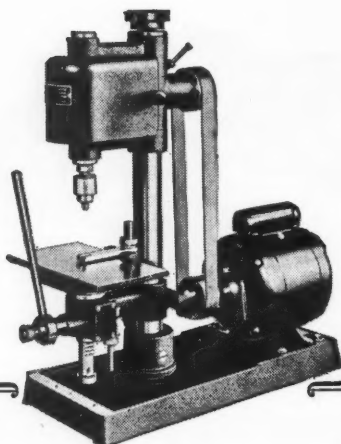
With the cost of designing, making, handling, repairing and storing jigs just about eliminated, your competitive position takes a turn for the better.

All the details about the way this *New Bullard Method* repeats any pattern of holes to speed production, reduce manufacturing costs, lessen operator fatigue, are contained in the new MAN-AU-TROL Spacer Bulletin.

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## INSTRUMENT TAPPER (SUPER-SENSITIVE)

The Hamilton Super-Sensitive Tapping Machine is designed for the precision industries. Tapping capacity, from the smallest and finest tap to 10-32 inclusive.

This machine has every wanted feature. Ease of operation. Height adjustable table. Adjustable stops. Ample clearances and travel. Silent and clean in operation.

Patented power transmission permits centering of tap without cutting and tapping to the very bottom of blind holes without tap breakage.

Our Bulletin T-47 gives the story and specifications complete. Write for it.



the metallizing gun is set at 0.015 inch per revolution.

The nozzle of the gun should be from 5 to 7 inches from the work, the shorter distance being selected to minimize overspray on parts of small diameter. The center of the spray pattern should be directed toward the

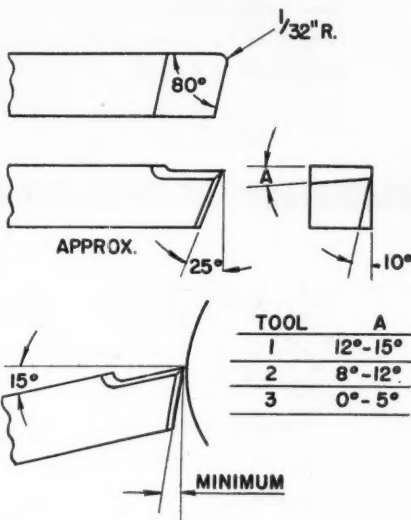


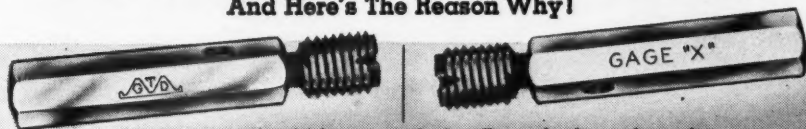
Fig. 11—Diagram of recommended toolbit angles for tools to be used in machining sprayed metal. (This diagram is to be used in conjunction with Table I.)

center line of the shaft. Before lighting the gun, however, make certain that it is pointed away from the work so that metal will not be applied until the flame has been adjusted. Spraying should start approximately  $\frac{1}{2}$  inch ahead of the prepared area to allow for the even spray pattern formerly mentioned. Also, spraying should continue  $\frac{1}{2}$  inch beyond the area for the same reason.

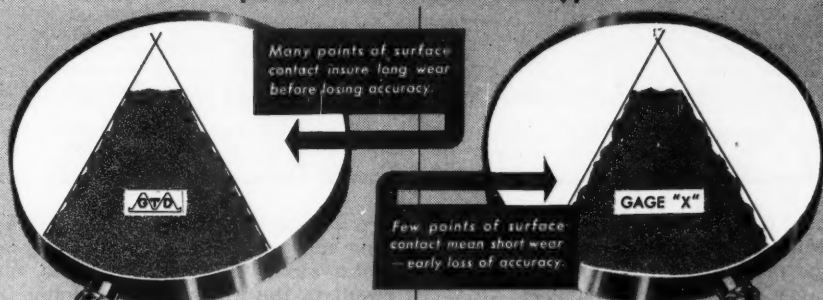
Some allowance should be made for finish machining operations. In general, 0.010 inch on the radius should be allowed for circular components up to one inch in diameter, with an addi-

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**The "Greenfield" Gage Will Outwear Gage "X" Many Times.  
And Here's The Reason Why!**



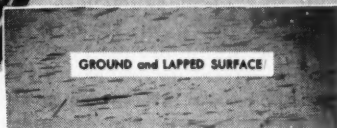
If these gages could be magnified sufficiently this is how the profiles of their threads would appear



Many points of surface contact insure long wear before losing accuracy.

Few points of surface contact mean short wear — early loss of accuracy.

A comparison of ground and lapped, and ground only surfaces is indicated in the following Microphotographs.

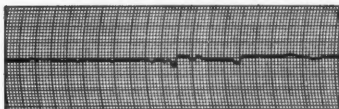


GROUND and LAPPED SURFACE

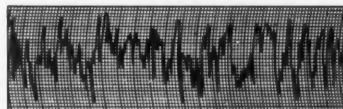


GROUND ONLY SURFACE

A further comparison of finish is indicated in Surface Analysis Graph.



GROUND and LAPPED SURFACE



GROUND ONLY SURFACE

Both gages will pass all measurement requirements. But the "Greenfield" Gage, because of its finely lapped surface, will outwear the other many times. All "Greenfield" Gages are lapped to an extremely high degree of finish. This "inbuilt" extra wear which gives long and accurate service and better value to users, is one reason for "Greenfield's" reputation in the gage field. For better gaging, "GO" Greenfield.



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TAP and DIE CORPORATION • Greenfield • Massachusetts  
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**Table I—Recommended Speeds, Feeds and Tools For Sprayed Metal**

(See Fig. 11)

Metal	Tool No.	Speed SFM	Feed In. per Rev.
Aluminum	1	125-200	.003-.005
Babbitt	1	150-250	.005-.008
Brass-Yellow	2	100-125	.003-.005
Bronze-Commercial	1	100-125	.003-.005
Bronze-Phosphor	3	100-125	.003-.005
Bronze-Tobin	3	100-125	.003-.005
Bronze-Tufton	3	100-125	.003-.005
Copper	1	100-125	.003-.005
Lead	1	150-250	.005-.012
Monel	1	100-125	.003-.005
Nickel	1	100-125	.003-.005
Iron-Swedese	1	50-100	.003-.005
Steel-10 carbon	1	75-100	.003-.005
Steel-25 carbon	2	50-100	.003-.005
Steel-40 carbon	2	50-100	.003-.005
Steel-80 carbon		(Must be surface ground)	
Steel-120 carbon		(Must be surface ground)	
No. 1 Stainless (18-8)	1	100-125	.003-.005
No. 2 Stainless (H-Cr)	0	(Must be surface ground)	
Tin	1	150-225	.006-.008
Zinc	1	150-225	.006-.008

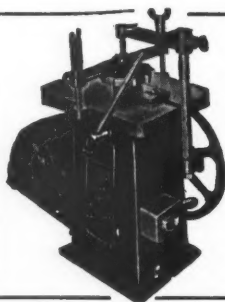
tional 0.005 inch on the radius for each additional inch. This allowance per inch may be reduced substantially on diameters exceeding 4 inches.

When preparing to spray a shaft with a keyway, soft key stock should be inserted in the keyway prior to spraying. This key stock should protrude approximately 1/32 inch above the finished coating dimension, and should be left intact until finish machining has been accomplished. A small punch can then be used to loosen and slide the key stock from the keyway. No attempt should be made to

pry the key stock out of the keyway. This may cause lifting of the spray metal along the keyway edges, and result in the necessity of redoing the job.

Due to space limitations, it is difficult to present exact data concerning the machining of sprayed metal in view of the numerous types of metalizing wires available. All sprayed metals except steels containing over .040 carbon and the stainless steels may be finish-machined. These latter must be finished by surface grinding.

In conjunction with machine ele-



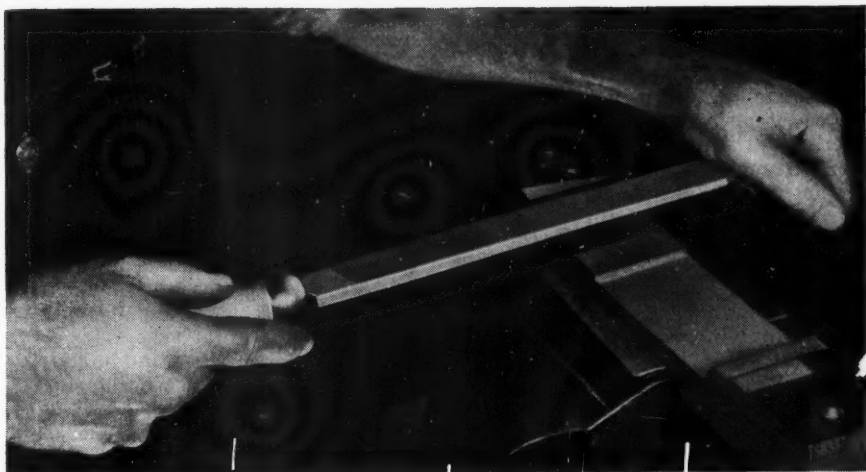
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Above action view shows the Nicholson Hand with one "safe" edge. A good assortment of machinists' files suitable for general diemaking consists of the following shapes and cuts for "roughing" and finishing:

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**PILLAR**—Bastard and Smooth double cut with one "safe" edge.

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**ROUND**—Bastard spiral (double) cut.

**HALF ROUND TAPERED**—Bastard double cut back and flat side; Smooth single cut back and double cut flat side.

**THREE SQUARE TAPERED**—Bastard and Smooth double cut.

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FOR EVERY PURPOSE

ments salvage work, however, where the lower carbon steels are employed, suffice it to say that machine tool adjustments should be very similar to those employed for machining cast iron. Due to the granular structure of sprayed metal, a pronounced shearing action should take place between the tool and work. This will prevent tearing of metal particles from the surface, and production of a rough finish in general.

Figure 11 illustrates three tools that have proved successful in machining sprayed metal. Table I used in conjunction with Fig. 11 will serve as a guide to the type of tool, speeds and feeds best adapted to each metal. When carbide tools are used, they should be ground approximately the same as the tools illustrated in Fig. 11, except that back rake should approximately be halved. Somewhat higher cutting speeds are permissible with carbide tools.

In general, any experienced machinist will encounter little difficulty in successfully machining sprayed metal. If he has never attempted such work before, he should have several scrap pieces sprayed, then experiment with various tool shapes, settings, and speeds. Data gathered in this manner will be useful in subsequent work of all types.

Finishing sprayed metal by wet or dry grinding is a highly recommended procedure. Very good results may be obtained if the right type of wheel is employed. Due to the granular structure of sprayed metal, wheels used for solid metals will load quickly, therefore a wheel with a soft-grained, relatively coarse adhesive is recommended.

Bronze, copper, all grades of carbon steels, and the stainless steels may be successfully ground with a 36-N-E Carborundum or similar wheel; a G60-P-W Carborundum wheel works well on nickel or Monel. In wet grinding



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*Quality-Built for  
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## FEATURES AND SPECIFICATIONS

9" x 3' South Bend  
Model A Bench Lathe

**SWINGS**—9¼" over bed and saddle wings

**BED LENGTHS**—3, 3½, 4 and 4½ feet

**DISTANCE BETWEEN CENTERS**—  
16 to 34 inches

**SPINDLE SPEEDS**—

Six—41 to 658 r.p.m.

Twelve—41 to 1270 r.p.m.

Sixteen—46 to 1176 r.p.m.

**POWER LONGITUDINAL FEEDS**—

Model A Lathes—48, .0015" to .0853"

Model B Lathes—26, .0021" to .0155"

Model C Lathes—14, .0021" to .0156"

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Model A Lathe—48 pitches,  
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The quality that is built into South Bend 9" Precision Lathes enables them to produce quality work with efficiency under all conditions. Regardless of the type of machining—between-centers, collet, fixture, or chucking—close tolerances can be maintained and a maximum volume of fine work produced with a minimum of effort.

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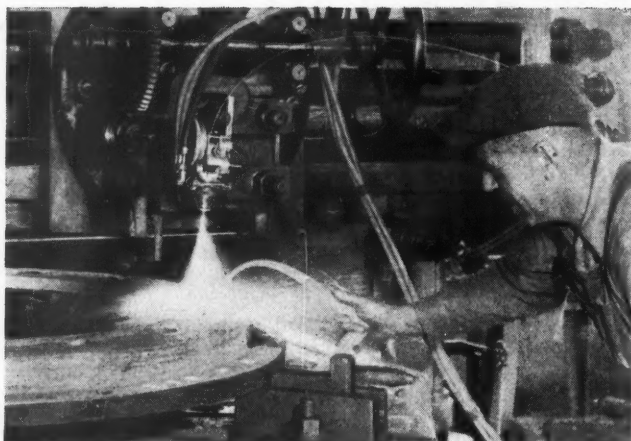


Fig. 12 — Using the metal spray process to relace a heavy turn-table platen with high carbon steel.

metallizing. Once fundamentals of the process are understood, its limitations appreciated, and its possibilities recognized, little difficulty will be encountered with specific types of work.

operations, soluble oil cut 50 to 1 is recommended.

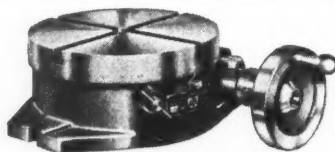
In general, high grinding speeds will prevent overheating and will produce a better finish. Wheel speeds above 6000 ft. per minute and work speeds above 80 ft. per minute are recommended. Traverse will vary from 16 inches per minute on the soft metals to 6 inches per minute on the harder steels.

### Conclusion

It has not been the purpose of this article to deal with specific metallizing jobs and the method of procedure for each. Nor would such information be of any real value to the average maintenance man concerned with

The "Use Table" presented with this article is but a cross section of applications that have proved entirely practical. Each of these applications will indicate many similar applications that may be attempted with complete confidence providing process requirements are rigidly met.

It will be noted in the "Use Table" that sprayed aluminum on steel is recommended to reduce heat oxidation. Cleaning, surface preparation, and spraying of the part is accomplished in the conventional manner. The aluminum coating should be from 0.008 to 0.010 inch. After spraying, the part is painted with three successive coats of potassium or sodium silicate, allowing



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9" to 25"

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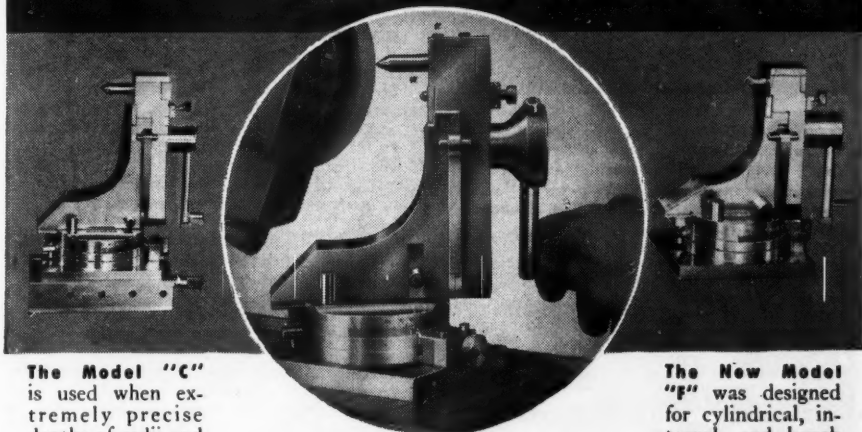


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FOR MOST FORM DRESSING REQUIREMENTS



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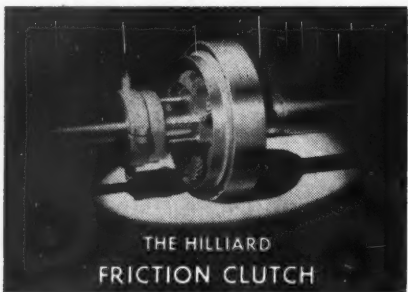
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each coat to dry before the succeeding coat is applied.

The work is then heated in a furnace to approximately 1500 deg. F., and held at this temperature for 30

#### Representative "Use Table"

- Rebuilding worn bearings on lathe and machine tool spindles and shafts.
  - Rebabbitting machine tool bearings.
  - Protecting machine tool parts subject to corrosion by spraying with zinc.
  - Grate bars, furnace parts, burner pipes, annealing pots, ladles, and hardening room parts sprayed with aluminum (aluminized) to prevent heat oxidation.
  - Storage tanks, steel girders, pickling and cleaning tanks, protected with sprayed lead.
  - Refinishing galvanized roofs and side-walls by spraying with zinc or lead.
  - Restoring press fits of all types.
  - Rebuilding worn gasoline engine parts, including crankshaft journals, main bearings, rod bearings, pistons, cam shafts, press fits, and bushings.
  - Rebuilding motor and generator commutators with copper.
  - Filling blowholes and porous spots in castings when defect will not impair casting strength.
  - Coating wood patterns to increase life (Use one of the softer metals such as zinc, lead, etc.)
  - Coating sand cores with steel.
  - Rebuilding soft-metal drop hammer and press dies.
- (Note: this list should be considered only as a guide. The suggested application should bring to mind many more that may occur in and about most shops.)

minutes. During this process, the aluminum diffuses with the steel to form a complex Ferrous-Aluminum alloy which is highly resistant to heat oxidation. Though this is not a machine element salvage job, it is applicable to many types of shop equipment that are intended to operate at elevated temperatures.

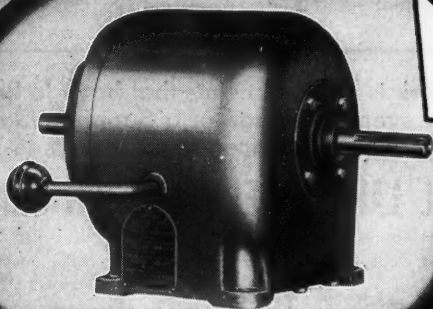
A last word relative to metallizing costs should be inserted here. Actual saving, of course, is dependent on several factors. Cost records indicate that savings of from 50 to 90 per cent over



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new parts costs may be anticipated on most jobs. These figures, however, do not take into consideration the fact that a part may be salvaged and returned to service in a matter of hours, while waiting for a new replacement unit might cause a machine to stand idle for several days.

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The booklet stresses the point—and quotes figures to prove it—that by multiplying production and thus lowering costs to the consumers, the machine has multiplied the markets for its products to such an extent that employment has in each case been increased much faster than the natural increase in population.

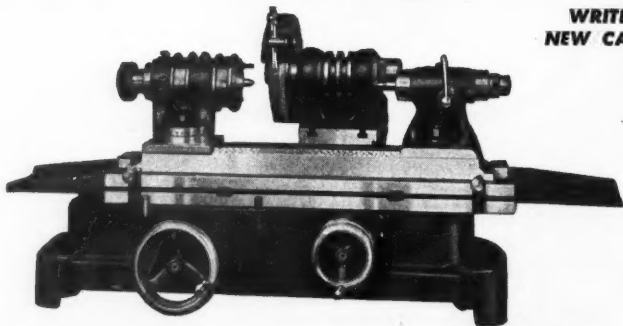
It would be a good thing for the nation as a whole if copies of this booklet could be placed in the hands of every American citizen. Copies are available without charge from the Association, at the address given above.

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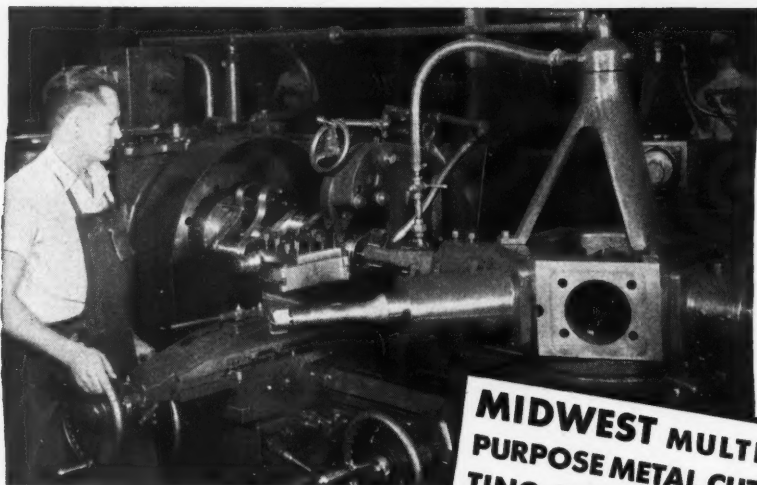
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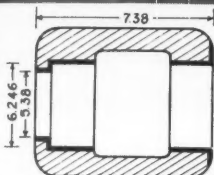
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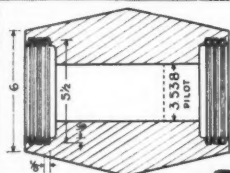
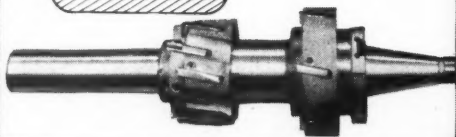
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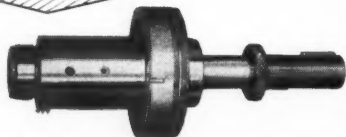
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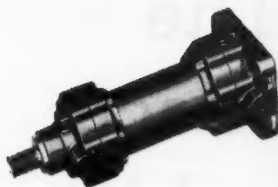
A 3-Operation, Inserted Blade Recessing Cutter for triple grooving steel suspension arms.



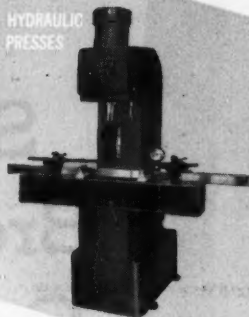
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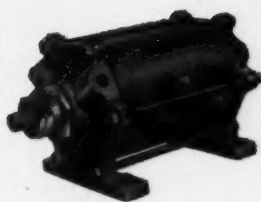
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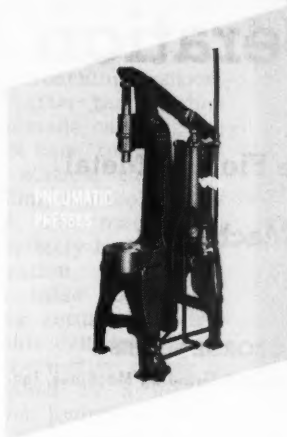
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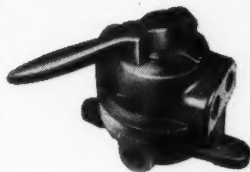
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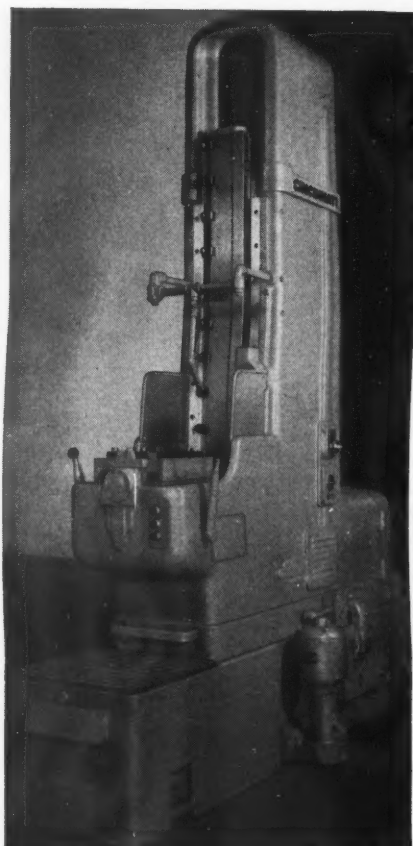
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# The Surface Broaching Operation

In the Field of Metal  
Machining

By GEORGE SQUIBB

Cincinnati Milling and Grinding Machines, Inc.

Fig. 1—(Left) Typical Design of Vertical  
Surface Broaching Machine

**I**N the last fifteen years surface broaching operations and machines have assumed an important part in metal processing. Broaching may be defined as the process of removing metal by means of a cutter traversing across the work, this cutter having a number of successive teeth or blades, each of which—since it is set a definite amount above the preceding tooth—removes a predetermined amount of stock.

The broaching process itself is quite old, having been used for many years for the production of internal keyways

and internal splines and for the finishing of holes; particularly holes that are not very long.

There has been a very logical change and gradual transition from the use of the process for this sort of operation to so-called surface broaching, or the finishing of exterior surfaces in high production. Let us examine the machines and tooling for these surface broaching operations.

Surface broaching machines are usually built in the vertical style as shown in Fig. 1. Shown here is a vertical single ram machine of three tons

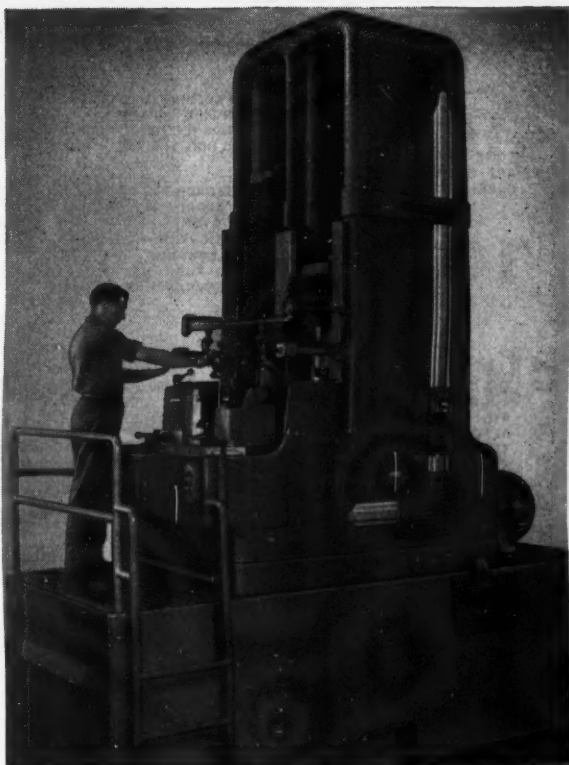


Fig. 2—Duplex Type of Broaching Machine. One Ram Ascends as the Other Descends

capacity and 48-inch stroke.

The operator is concerned with only two of the working elements of this machine. The ram, or vertical slide, moves up and down and carries the cutting tool. The table moves in and out, carrying the work into broaching position, and after the cut has been made, carrying the work back to the loading station, thus permitting the tools to return. The machine is completely hydraulic in operation, both ram and table movements being actuated by hydraulic cylinders.

The motive power is supplied by a motor-driven hydraulic pump, and the direction of movement is controlled by a valve. A lubrication system is about the only other essential unit, although the design includes the base, column, knee, bonnet, control mechanism and coolant.



The machine shown in Fig. 2 is a 10/66 Duplex. This machine is similar to the single-ram type of machine except that it has two rams and is therefore called a duplex-ram machine. The rams alternate, one going up while the

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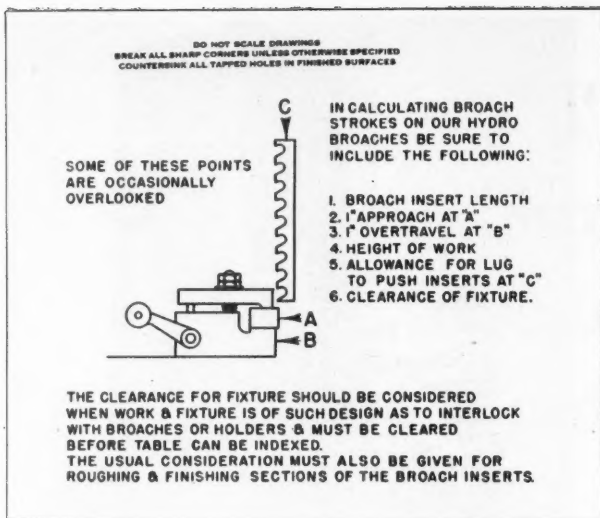


Fig. 3—Simple Broaching Set-Up, Using a Broaching Tool Formed of Inserts

ing and loading the work. In all other respects, the machine is the same as the single-ram type.

The drawing Fig. 3 shows a fundamental setup. Such as would be experienced on a very simple job. The workpiece here is simply a block of metal upon which it is desired to finish one

other is coming down. The table is of the swiveling type and carries two work fixtures.

Assuming that the right-hand ram is descending, the table would be swiveled to the right so that the fixture on the right-hand side of the table would be in broaching position. As the left-hand ram ascends the fixture on the left-hand side of the table is swiveled away from the cut, so that the finished work can be removed and the new work inserted.

After the fixture has been reloaded, the table is then automatically swiveled to bring this left-hand fixture into the broaching position, at which time the left-hand ram will descend in the process of taking a cut. Then the right-hand side of the machine is available for remov-

side. The fixture, which would be mounted on the moving table, is a simple hand-clamping fixture. The cutting tool, formed of broach inserts, is shown in its position. Depending upon the cut, there would probably be several of these inserts arranged in line and mounted in a so-called broach holder, which in turn would be clamp-

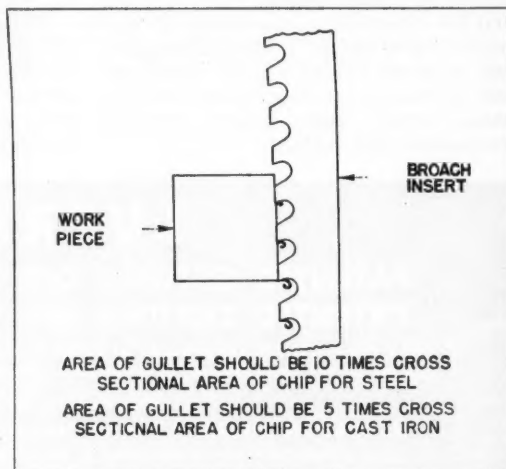


Fig. 4—Drawing Illustrating Cutting Action of the Broaching Tool

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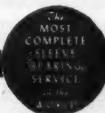


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PITCH	CHIP THICKNESS TIMES LENGTH		PITCH	CHIP THICKNESS TIMES LENGTH	
	STEEL	CAST IRON		STEEL	CAST IRON
1 4	.0014	.0028	13 16	.0145	.0290
5 16	.0022	.0044	7 8	.0168	.0336
3 8	.0031	.0062	15 16	.0193	.0386
7 16	.0042	.0084	1	.0220	.0440
1 2	.0055	.0110	14	.0330	.0660
9 16	.0070	.0140	12	.0495	.0990
5 8	.0086	.0172	13 14	.0673	.1346
11 16	.0104	.0208	2	.0880	.1760
3 4	.0124	.0248			

Fig. 5—Chart Showing Relationship of Tooth-Pitch and Chip Thickness to the Chip Space

ed on the ram of the machine.

In calculating the broach stroke, following are some of the points which should be considered.

The cutting action of a broach, illustrated in Fig. 4, results in a clean cut. As the tooth enters the work, it starts with a given thickness of chip and continues with this same chip thickness throughout its cut. It is always called upon to do the same job.

The roughing teeth remove the metal in rather thick chips and in the course of the operation encounter the scale, hard spots, and so on. Under such conditions the teeth deteriorate accordingly. However, the finishing teeth take lighter chips and operate in clean, uniform metal. On steel forg-

ings, in some cases the tool cost for broaching is about 1/12 that for milling cutters on the same operation.

As each cutting tooth passes over the work, it will be noted that the chip which is being cut must be maintained in the chip space (chip gullet) for the entire length of the cut. Consequently, in the design of broaching inserts, it is essential that proper consideration be given to the pitch of the teeth because the pitch determines the amount of chip space available.

Figure 5 is a chart which shows the relationship for various pitches of the chip thickness and the length of the chip (in effect, the cross-sectional area of the chip) as compared to the

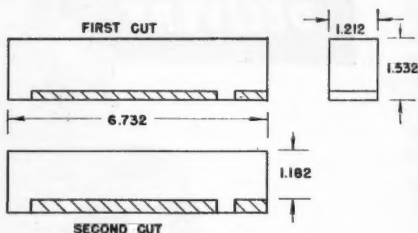


Fig. 6—By Taking Two Cuts on this Workpiece, Necessity for an Extra Heavy Machine Was Eliminated and Production Was Maintained at Requirements

chip space provided in any pitch of broach insert teeth.

In broaching, speeds of thirty to



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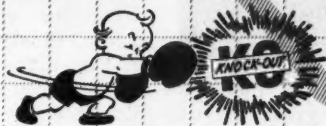
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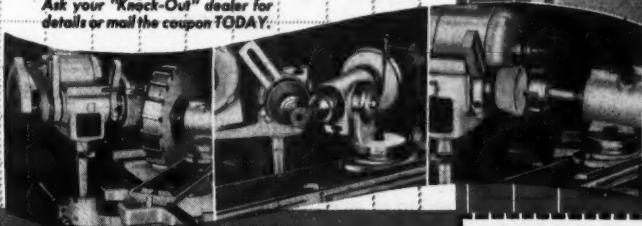
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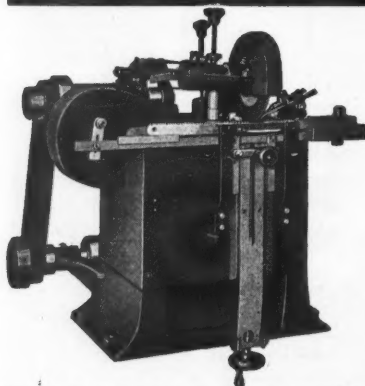
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**Fig. 7—Group of Chuck Jaws Machined by Broaching. With Three Work Stations, Using Three Rows of Tools on the Holder, Twenty Chuck Jaws were Accommodated**

forty feet per minute maximum are commonly used. At these speeds the tool life is enhanced greatly, inasmuch as they are quite low. Application of coolant is much easier, on the broaching application than for milling. On the broaching tool, the coolant can be directed exactly where it is wanted, and actually flows between the tooth spaces, under a slight pressure, pro-

viding maximum cooling and thorough lubrication. On the work-piece illustrated in Fig. 6 the volume of metal to be removed was too great for one cut on a ten-ton, sixty-six inch stroke broaching machine. Also the production requirements were only fifty pieces per hour, whereas this machine could produce one hundred pieces per hour. The combination worked out very well by taking two cuts on the same piece. This halved the production to fifty, which



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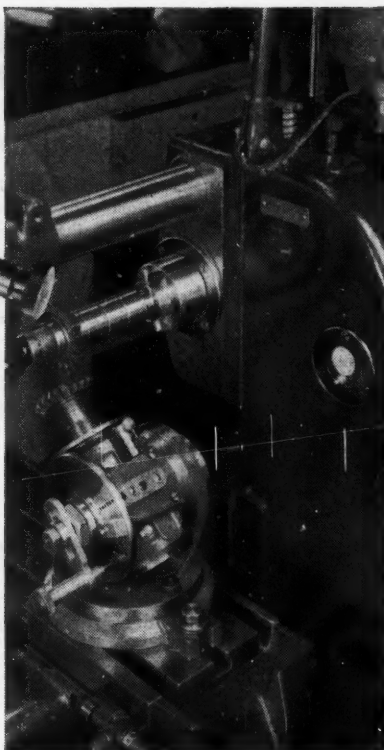
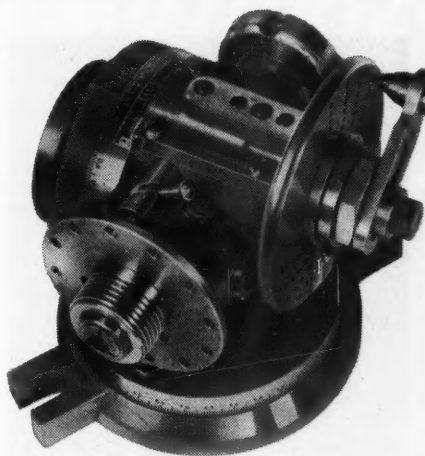
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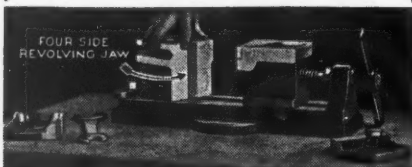
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was just what was required, and at the same time the job was brought within the capacity of a normal-sized machine.

The illustration Fig. 7 shows a group of chuck jaws for a convention-

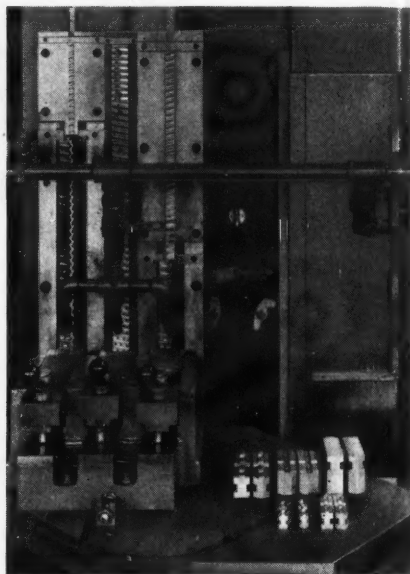


Fig. 8 — Illustration of Set-Up for Machining Chuck Jaws. The Finished Jaws are Shown on the Machine Table

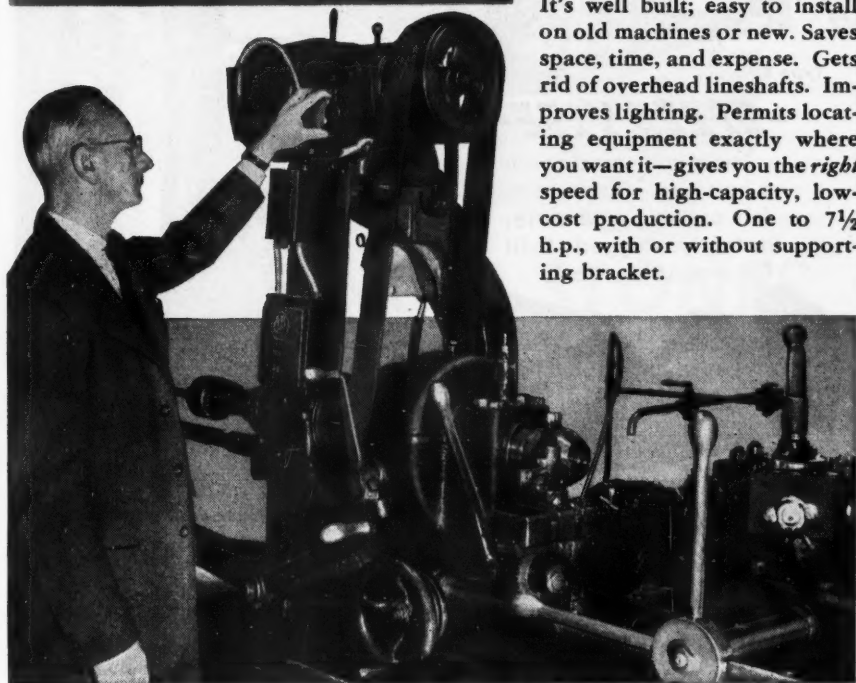
al 3 or 4-jaw chuck, together with the locating blocks. The chuck manufacturer cooperated with the broach designer to a great extent in standardizing on certain angles and sizes. With such cooperation, it was possible to engineer the three work stations shown in Fig. 8, using the three rows of tools on the holder, to accommodate twenty different chuck jaws. The operation is to broach the front and back ends of the jaw. The production, using just one side of the machine, is 137 chuck jaws per hour through both operations.

The machine shown in Fig. 9 is set

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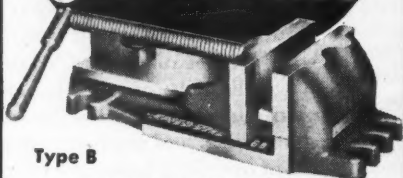
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up to broach a recess for the carbide or cast metal tip in a lathe tool shank. The shanks varied in sizes from  $\frac{1}{4}$  inch square to  $\frac{3}{4}$  inch by 2 inch. An-

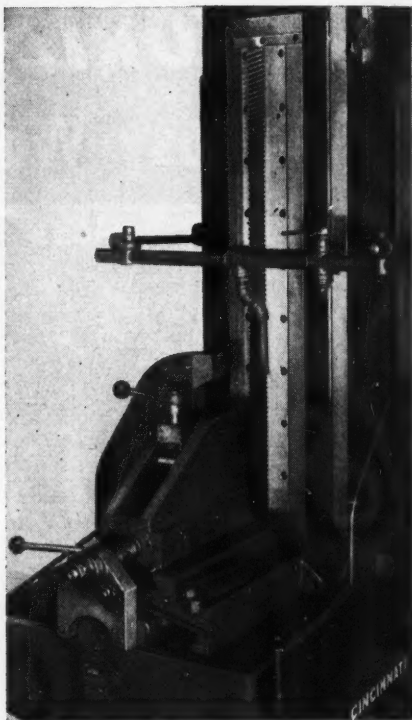


Fig. 9—Broaching Machine Set Up to Broach a Recess for the Carbide or Cast Metal Tip in a Lathe Tool Shank

other problem was presented by various angles required on the shank from straight, or zero, up to 90 degrees. All of these shanks were accommodated in the fixture shown on the table of the machine.

The machine is of the ten-ton 66-inch stroke single ram type. One row of tools mounted in a very simple holder took the required cuts on all of the shanks. Production was 100 shanks per hour.

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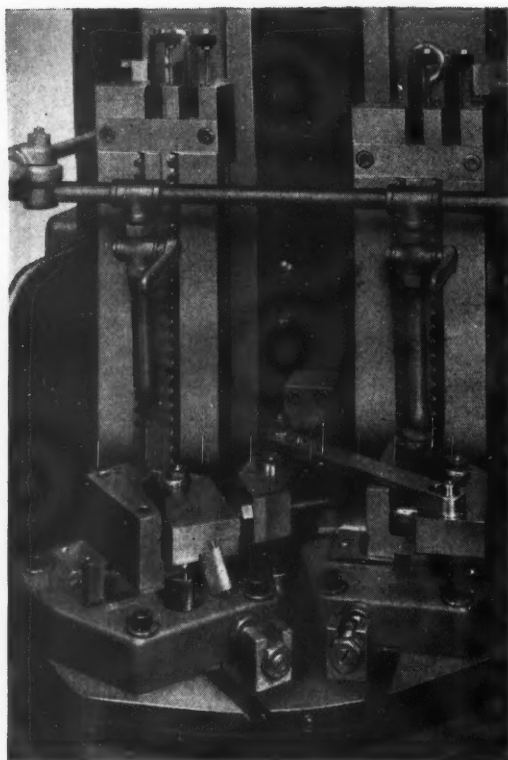


Fig. 10—Duplex Hydro-Broach Set  
Up to Broach Convex Contours on  
Tool Inserts

which are mounted in the broach holders shown on the machine ram. You will note that there are two rows of tools in each of the two holders. This method provides four rows of tools to match the four different radii involved in this unit. The fixtures similarly accommodate all four blades, holding them in a vertical position for taking the cut.

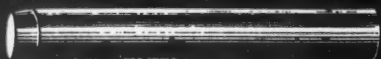
The blades are rather delicate, being made out of light gage sheet metal and hydrogen-brazed. The clamping of these parts is somewhat critical, inasmuch as the parts are frail, and accordingly automatic, spring powered clamping was used in order to pre-

Shown in Fig. 10 is a one-ton thirty-inch stroke duplex hydro-broach set up for the finishing of the convex backs of the blades. In order to cut the convex surfaces, it is necessary to have concave formed broach tools

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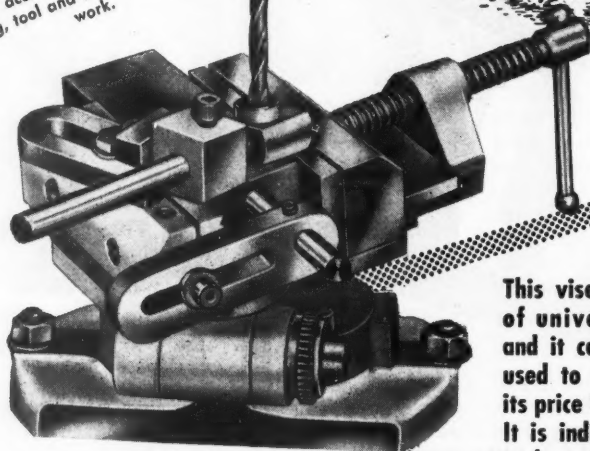
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# American Management Association Personnel Conference

By DON H. WIMMER

*Special Correspondent*

**T**EN sessions and panels of the 1947 Mid-Winter Personnel Conference of the American Management Association at the Palmer House in Chicago, Feb. 24-26, were devoted to the one top management concern this year—labor problems—particularly as related to “how to live with the unions” and what should be done to promote better human relations between top management and employees, before the public steps in and imposes its own ideas of how the general economy should be operated for the benefit of the public.

American industry is on trial. Management must convince the American worker that it does not have hidden fangs. On the other hand, labor must show management that it wants to “get along.” Unions must realize that they have a three-way job—they must be square with their members, management, the public—because from here on in, the public will sit at the conference table. These were some of the definite conclusions coming out of the three-day conference.

The labor relations outlook was ably handled by the Rev. Benjamin Masse, S. J., associate editor, *America*, and a noted layman economist, and Dr. Jules Backman, professor of economics, New York University. Masse charged that both management and organized labor are victims of a “cultural lag”

in not realizing that changing economic conditions “have given the public a place at the bargaining table.” He declared that except for the Communist element in this country, labor favors the American system, but warned that the individualistic industrial viewpoint smacks somewhat of paternalism. This viewpoint still persists in the minds of some executives.

The alternative facing the country today is either that large groups are going to work for the good of the public, or eventually government is bound to take over both labor and management. We must place new emphasis on group activity and group responsibility. We must treat workers as human beings. Management holds in its hands the continued life of free enterprise, as contrasted to Communism, which is an organized system of dogmas. It has spread its system of slavery all over Europe, with Russia counting on a breakdown in the American system.

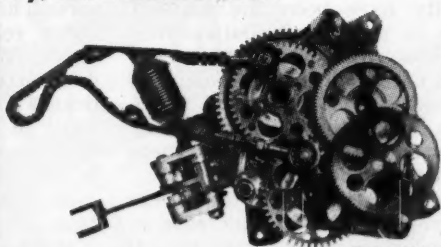
We must give the public a seat at the bargaining table and give the worker more security, although the guaranteeing of annual wages (as a remedy) is an almost impossible task unless taken over by government, because of the element of a changing and unpredictable economy. It is a group problem and cannot be successfully solved except on a group basis.

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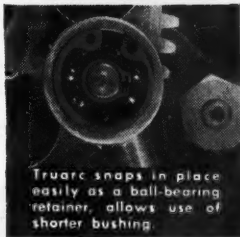
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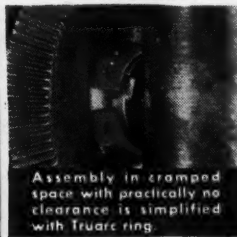
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Backman took the stand that increased productivity of labor will fall short of solving our current labor problems and economic ills. "Unfortunately, many persons have taken the use of this statistical measure to mean that labor is responsible for the changes in productivity. While workers have made some contribution, the fundamental factors contributing to productivity have been the marked expansion in plant and equipment—the tools which the worker has available—and managerial know-how. The use of a convenient statistical measure such as output per manhour, should not be allowed to confuse these cause-and-effect relationships."

He gave the reasons for the failure of the great anticipated increase in production since V-J Day as: 1, strikes; 2, shortages of materials and parts; 3, absenteeism; 4, high labor turnover; 5, disorganization of production attending reconversion; 6, un-

healthy attitudes by many workers; 7, over-employment, i.e., hiring workers in anticipation of need, hoarding of labor, and so on; 8, union regulations—"make work" practices; 9, low volume—attributable to many of the above factors, and 10, inexperience of many workers.

Manhour output may be expected to improve in the months ahead in proportion as retarding factors disappear. Labor relations are expected to improve. Trouble ahead may well be more strikes and "make work" practices. Factors leading to better productivity in 1947, are seen as: 1, improvement in machinery and equipment; 2, better planning and shop management, and 3, greater volume of production.

We have not seen the full impact of high prices this year, a situation traceable to the major steel and coal strikes of last year and increased wage agreements in general. Any de-



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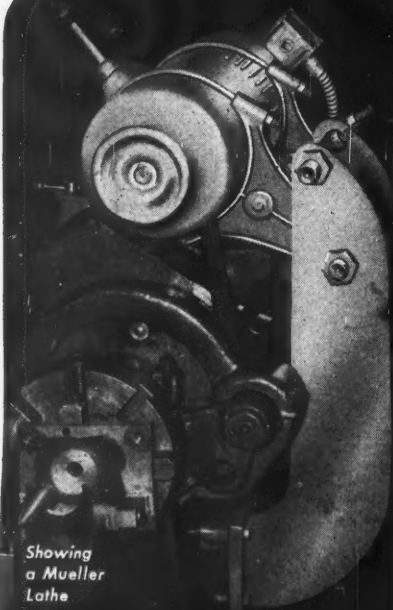
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cline in living costs will depend on what happens to wages. There is much evidence that the price level of durable goods will continue to increase. In time, labor will be willing to adjust wages in return for more job security.

Personnel activity in competitive operations was handled by Guy B. Arthur, Jr., vice-president, personnel division, American Management Association; Neal E. Drought, personnel department, Radio Corp. of America, and L. E. Schmidt, Commander, U. S. Navy, Office of Industrial Relations.

Arthur charged that top managements are fumbling the ball in their handling of personnel relations. "For some reason, a majority of our industrialists do not associate sound personnel administration with profits and do not appreciate the importance of satisfactory relationships between human beings, and are not aware that personnel administration is a top, middle and bottom management job—with emphasis upon the top."

Drought said that one of the principal objectives of a personnel program is to keep employee turnover at a low rate. He said time spent in determining the fitness of the employee to the job will pay off in reduced labor turnover.

Commander Schmidt said that in evaluating a personnel program, or any program, there are four basic questions for which affirmative answers must be found before we can be assured that we are performing effectively and efficiently; 1, is the program needed; 2, is it working properly; 3, is it rendering a staff service, and 4, is it earning at least what it costs? If we can show top management that we have made such contributions to his mission, we shall have succeeded in demonstrating the value of our personnel program.

The value of motion pictures in employee relations was demonstrated with a showing of several industrial

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films through the courtesy of Standard Oil of New Jersey and Marshall Field & Company of Chicago. Daniel Rochford, employee relations department, Standard Oil Company, said the motion picture is an emotional vehicle—probably the strongest vehicle we have for employee training and educational purposes. Many of the large corporations make liberal use of the motion picture film for training purposes and find it highly successful in obtaining employee cooperation.

Standard Oil uses films in its New York area at selected employee luncheons. He said it costs his company \$180 to \$250 to hire and train new domestic employees, and \$2,000 for employees for foreign service—therefore the cost of the training films is justified.

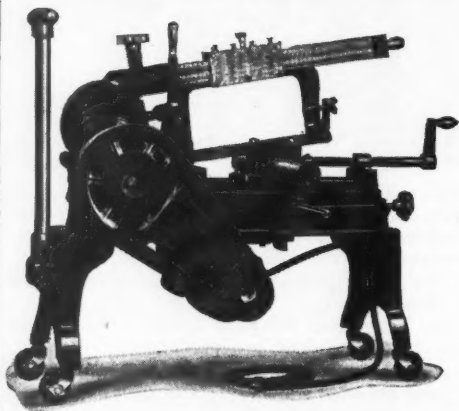
Negotiating the labor agreement open forum, chairmaned by George Hodge, assistant to vice-president, International Harvester Company, was a closed session of shirt-sleeve discus-

sion of what should constitute the labor agreement. On this important panel were Earl Plank, Jones & Laughlin Steel Co.; Michael Richenow, Goodrich Tire & Rubber Co.; Charles Hodge, assistant personnel manager, Koppers Co., Inc.; G. E. Morse, industrial relations department, Sylvania Electric Products Co., and Harris W. Botruff, industrial relations director, Sealed Power Corporation.

Throughout the 10-session over-all conference there evolved a general feeling that nothing would be gained by trying "to beat the union." Rather, it appeared to be the general consensus of opinion that management should dig deeper for solid facts for presentation at the bargaining table. It was agreed that collective bargaining is here to stay and that a way must be found to live with it in a spirit of give-and-take and in full cooperation with labor's legitimate objectives.

Foremen, it was agreed, should be

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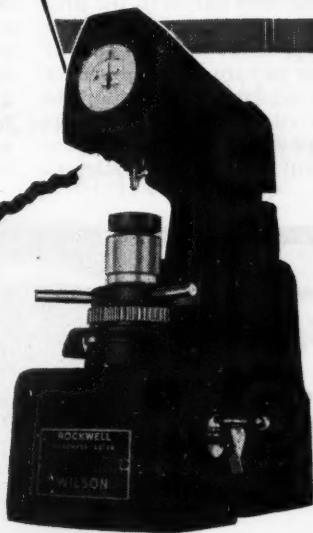
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kept informed of management's union contract thinking—they should know what management's attitude, as well as actual demands, is going to be when management and labor sit down to the bargaining table. This procedure, it was recommended, would aid greatly in smoothing out weak and sore spots in labor's ranks.

There was a feeling also that the days of the old rugged individualism are past. In their place has come the era of mass agreements and group action. Top management must be made to recognize the entrance and durable occupation, from now on, of the principle that management and labor are a part and parcel of the production process. A part in which labor must be viewed as an integral part of the production picture on the basis of better human relations. The failure to recognize the vital importance of the human relations equation of the production line will invite more participa-

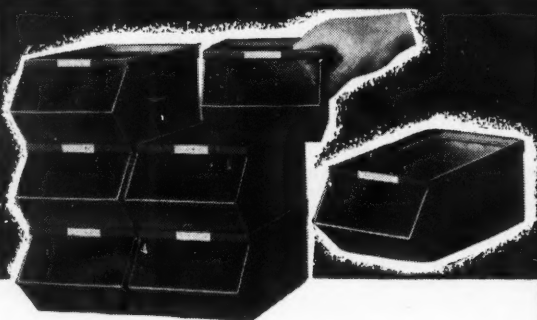
tion by the public at the bargaining table, and more likely the imposition of an entirely new system of government control.

Trends in arbitration were handled By Gerald Reilly, Washington attorney and former member of the National Labor Relations Board, Andre Maximov, New York attorney, and Ralph Seward, impartial umpire, General Motors Corporation.

Reilly said employers do have some rights under the Wagner Act, mostly from the angle of plant and property ownership and the common law relationship of employer and employee, rather than from provisions of the Act. He said the movement toward unionization of foremen is circumscribed to the extent of the application and cooperation of foremen's organizations with employee unions. Most strikes today arise from economic factors rather than from institutional union factors.

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Maximov's viewpoint is that industrial arbitration is the best solution developed so far to handle labor relations, pointing out, however, that the quality of arbitrators is very bad—adding more confusion to what might be termed “a hydra-headed monster.”

He declared that the future success or failure of industrial arbitration will depend on the accessibility of good, capable arbitrators. Great care should be taken in the drafting of union contracts. The language should be definite—not general. He advised the inclusion in every wage agreement of clauses incorporating everything in favor of the company “except as hereinafter specifically provided.” This clause should be inserted as far up in front of the contract as possible, or the contract may even be opened with this clause as a matter of helping to prevent possible disastrous trouble later.

Seward said the servicing of a labor agreement is a “lifetime” job—that is, for the duration of the contract. He said the signing of the contract is only the beginning. The framework of the agreement and the applying of the terms of the contract within the framework of the contract, is the real and permanent job of the arbitration agreement.

The principle of handling grievances is fairly well accepted, but little progress has been made in developing actual grievance practices under arbitration. First to consider is the type of arbitration wanted—a 1-man or a 3-man board. Will the selected arbitrators be appointed on the basis of availability when needed, or a permanent job? Choice of men should be approved by both the company and the union. The future holds promise of more arbitration if strikes are held down, making the arbitrator loom up as a man of high importance.

Channels of employer-employee communication was handled by Robert Newcomb, Newcomb & Sammons;

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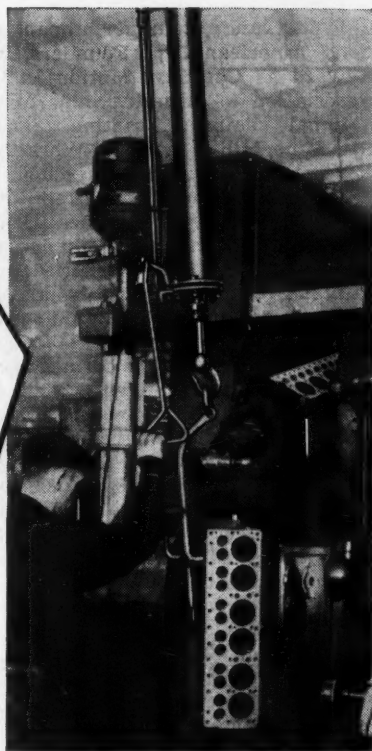
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B. F. McClancy, manager human relations, American Type Founders, Inc.; Edward T. Cheyfitz, Motion Picture Association of America, and former national chairman, casting division, CIO Mine, Mill & Smelting Workers.

Newcomb declared management has itself to blame for the bad reputation brought upon itself at times because of the impression from many quarters that American free enterprise gives capital everything it wants, and the working man nothing. He said the discord between "much of labor and much of management is certain to continue unless management speaks up, in a voice that is heard, understood, and most of all, believed." Management has the tools and the story.

There are approximately 5,000 employee publications in the United States, produced at an annual cost of \$30 million. "Much of this has been poured down the drain. However, today management is beginning to review

employee publications in the light of their usefulness as interpreters of policies and programs, rather than as purveyors of plant gossip. It is beginning to discover that here it has a powerful medium for reaching employees."

McClancy said his experience in the field of polling employee opinions has been educational and entertaining. He said the successful opinion poll must be based on a specific objective, otherwise it will fail completely. He believes supervisors should be informed of the nature of polls as a means of gaining their cooperation. Also, it is advisable to keep the union informed on the taking of polls as a means of forestalling future antagonism—for example, taking a poll on whether employees are satisfied with current wages, just before the start of wage contract negotiations. In some cases, where the nature of the poll may be controversial, it may be advisable to call in an outside organization. The cost of con-



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ducting opinion polls is what you want to make it.

Cheyfits said employees want to know all about wages, opportunities for advancement, job security. Company information programs could well start with these vital subjects for the employee. In view of the findings of the recent Elmer Roper survey which disclosed that 50 per cent of factory workers are not happy in their jobs, he suggested that industry must develop and use techniques of leadership that distinguishes between man the tool, and man the individual. The concept of the dignity of man should be upheld, through development of constructive attitudes which help to build employee morale and a liking for his job.

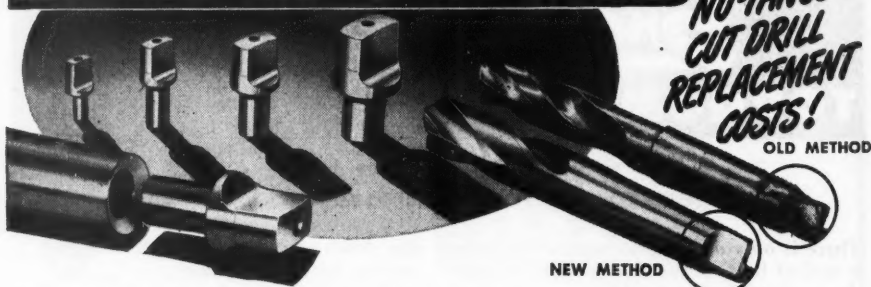
Trends in collective bargaining and unionization was handled by Robert Burns, Science Research Associates of Chicago; E. H. van Delden, director of industrial relations, Libbey-Owens-

Ford Glass Co., and Vincent Ahearn, executive secretary, National Sand & Gravel Association.

Burns divided the white collar workers into two groups: 1, professors, technical engineers, artists, nurses, government employees, editorial men, and so on, numbering 4,000,000, and 2, sales and service workers, 7,500,000. He forecast the white collar group in the future will probably become the largest single economic group in the United States. Unionization started about 1930. Today about 1,400,000 belong to eight CIO and eleven AFL affiliated unions, with women accounting for about 40 per cent of the total membership. There are about 6,000,000 non-union white collar workers today.

The proportion industry-wise of white collar union members to unorganized workers in various industries is approximately: railroad, 90 per cent; telephone, 33 per cent; wholesale and retail clerks, 10 per cent; manufactur-

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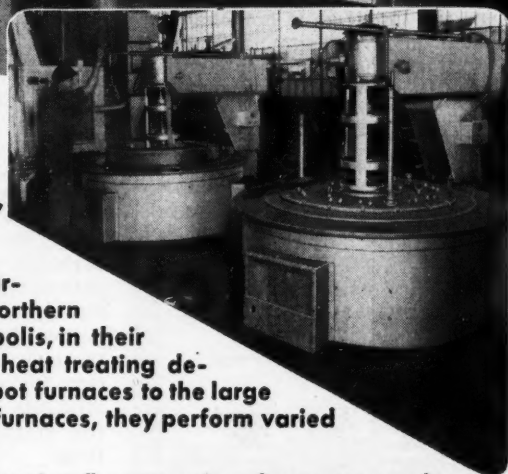
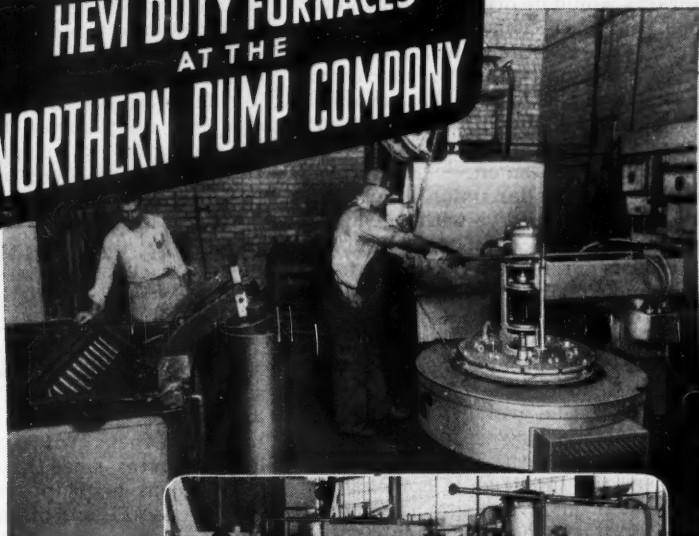
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ing and industrial fields, 5 per cent. He predicted that 10,000,000 white collar workers would be organized within the next ten years. This premise is based on the desire of the white collar worker to gain something for educational status, and the feeling that he should get at least as much pay for his services as the uneducated common laborer, janitor, and so on.

The white collar union is here and we might as well live with it. Old concepts die hard, but the white collar worker is influenced by the success of the union members surrounding him. One remedy might be to standardize office workers' wage rates, based on more frequent promotions.

Van Delden declared management must take the lead in bringing bargaining terms down to earth—and in detail. He said the immediate objectives of the union have not changed. They will involve huge amounts of money. If this is unobtainable, they will go all-out for non-money goals

like job security. He warned that collective bargaining is a serious business and as such, there must be a return to individual plant decisions.

We are now approaching a change in the concepts of collective bargaining. The cycle appears to include three stages of relationship: 1, competitive; 2, conciliatory; 3, reciprocal. Much of the antagonism is past and we are entering a conciliatory or compromise stage of bargaining. We should now prepare for a period of relative equilibrium and cooperation.

Ahearn pictures the growing force of public opinion on labor settlements of the future. No more tying up of the national economy by coal and steel strikes that adversely affect the public interest. Employers will have to bring out their own idea of handling labor disputes, since they will get little government help apparently because of a general lack of interest in the rights of employer. Collective bargaining "just must be made to work," since there really is no satisfactory solution to our problems.

Although Congress will enact some needed labor legislation, we cannot live in industrial peace by legislation alone. Something will be done about curbing jurisdictional fights, sympathy strikes, boycotts, and so on. Unless something is done, the public will be heard from. He warned labor that the closed shop has no friends among thinking people, and that the right to strike is a qualified right, and not a full statutory right without reservations.

Fowler McCormick, chairman of the board of the International Harvester Co., as dinner speaker, declared that "we have now arrived at the point at which it is recognized that nothing is more important to business than the subject of human relations."

He classified the human relations with which management is concerned in eight groups: within management itself, relations with stockholders, em-

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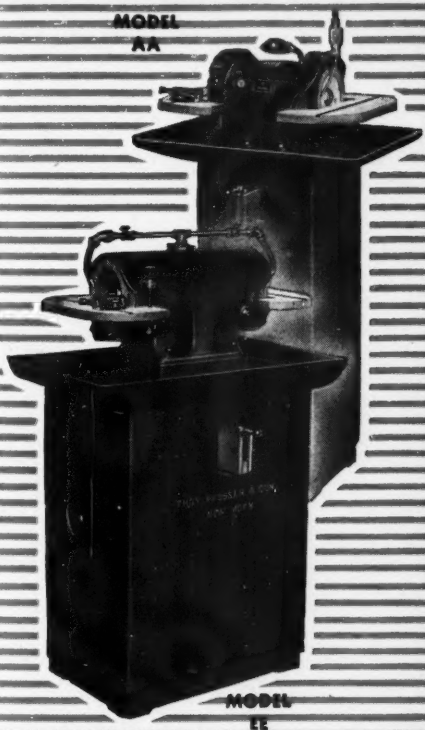
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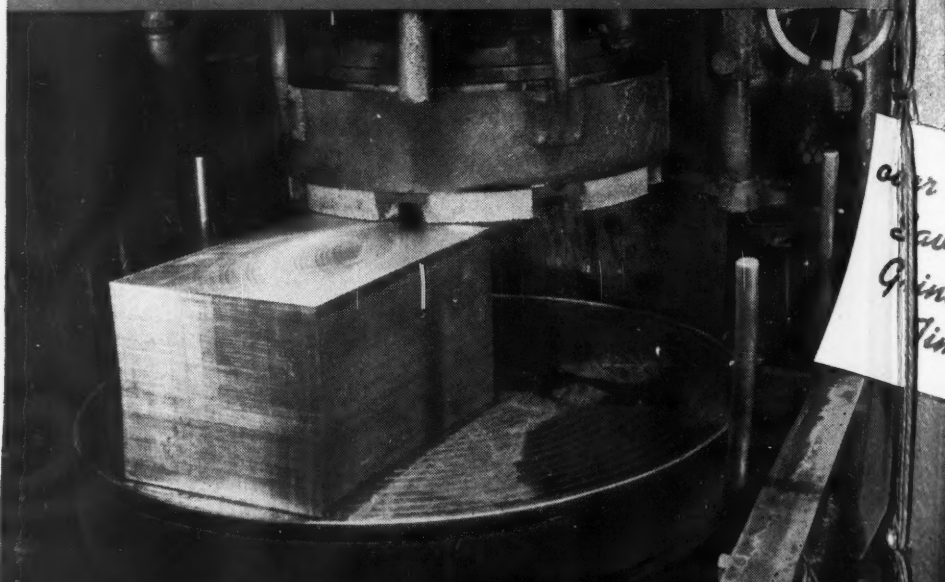
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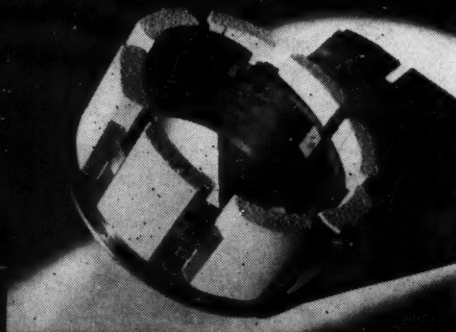
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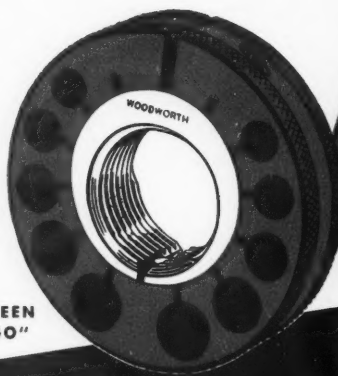
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ployees, customers, dealers, suppliers, the general public, and governments.

He cited four sources from which solutions of the human relations problems of American industry can emanate: 1, re-establishment of individual personal relationships; 2, all the management techniques, such as those discussed by the American Management Association, which build better human relations; 3, the whole field of knowledge about human beings, both as individuals and in groups, and 4, the practical application of the Golden Rule.

He voiced the opinion that management and labor must get together and quickly, or the people may demand a completely new economic system. He declared that the whole field of human relations is now more important than ever before.

Advances in personnel techniques was handled by Dr. David Cook, assistant director of industrial relations, General Aniline & Film Corp.; B. B. Warren, division manager, personnel compensation, General Foods Corp., and Guy Wadsworth, vice-president, Southern California Gas Company.

Dr. Cook dashed some of the old concepts of hiring personnel through the application of some pet psychological theory. He advised to "never hesitate to hire a redhead or a chinless individual, and don't make the mistake of thinking that all square-jawed men can fill jobs requiring aggressiveness."

Warren described how his company, faced with a problem of adjusting compensation of managerial personnel, fashioned a tool of salary administration by placing standards in the hands of vice-presidents, thus relieving the president of this time-consuming job. The vice-presidents make the majority of salary decisions. His method of evaluation as a basis for fixing salaries, developed into: 1, knowledge—what does incumbent have to know in general technical and specialized fields; 2, decisions—how new, compli-

cated and difficult are situations to which he must apply his knowledge and on which he must form correct decisions and judgments, and 3, responsibility—what is entrusted to him that is valuable to the company and that may be affected by his decisions and judgments? Compensation is based on these factors.

Wadsworth said the employee, in demanding strict adherence to seniority ratings based on length of service, may find himself barred from free access to opportunity for promotion. He said the employer, if he is to use the policy of promotion according to merit, should devise some method or standard of uncovering and developing the merits of individual employees. This is the time to get rid of undesirable and incompetent employees without waiting for some favorable excuse, such as another depression.

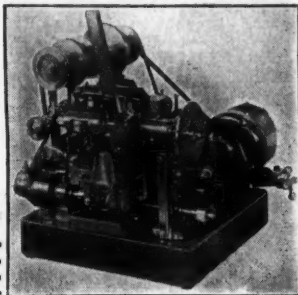
The growth of industry-wide bargaining was thoroughly treated at the

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concluding day luncheon by Cyrus S. Ching, director of industrial and public relations of the United States Rubber Company.

Ching said "Industry-wide bargaining is a long step away from what the American people have been taught to expect as a result of individual initiative and a free competitive market, as it means we are dealing with a situation where two monopolies may be negotiating in the best interests of the public or their own long-run interests. This usually brings about a situation where the struggle is for prestige and power on the part of one or both groups, without regard to the impact of settlement on either the employee or the individual companies or the general public."

He cited a trend in government and academic circles toward believing that industry-wide bargaining is the answer to all problems, "and as far as the government is concerned—it is."

It seems to me that industry-wide bargaining, like many other things, is usually introduced as a measure of expediency in tough situations by government or labor management. Thus there is a great temptation on the part of management to enter this type of arrangement where uniform demands are made on an industry either for wages or other conditions by strong labor unions, as a means of conducting better negotiations, when, for self-protection, employers are practically forced together for bargaining purposes. "Industry-wide standard wages would be an automatic death sentence to many high labor cost manufacturers who are unfavorably located relative to raw materials or markets. The result of adopting industry-wide bargaining in this country probably would be that the consumer would be exploited to a greater extent than workmen, because so much of production goes into the domestic market."



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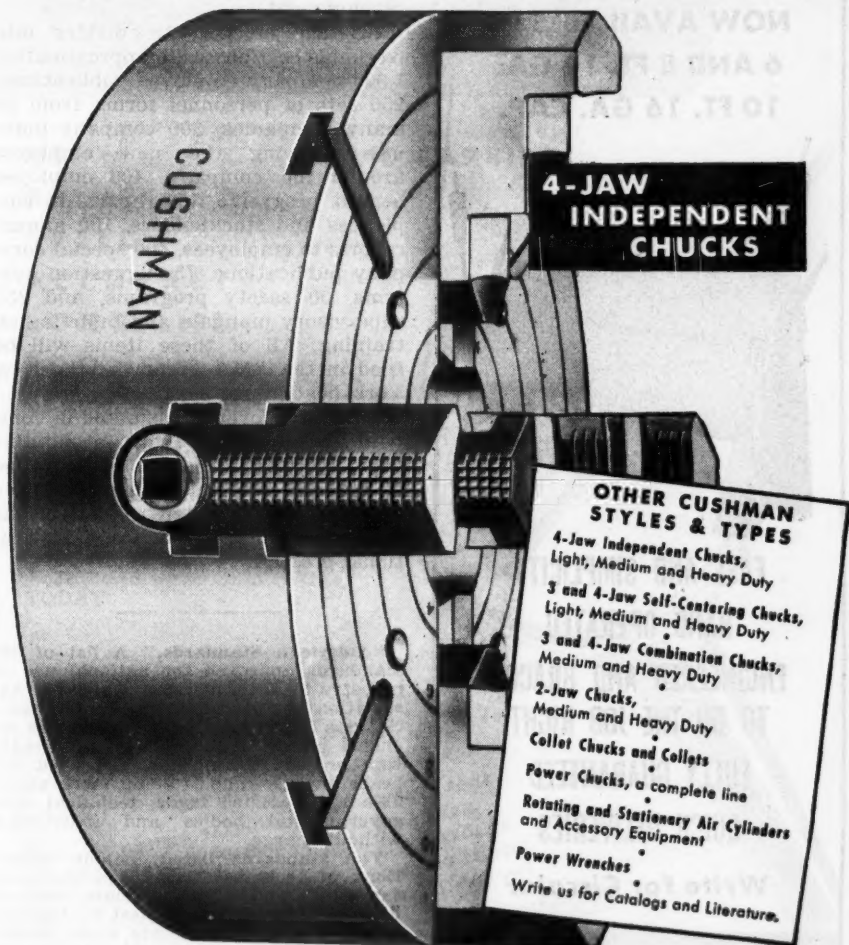
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The Personnel Workshop made its first appearance at this AMA personnel conference. A success from the opening hour, the ambitious exhibit covered the whole range of personnel forms and publications for use by management.

Among the exhibits, divided into workable sections were approximately 1,000 company employee publications, 250 sets of personnel forms from as many companies, 300 company manuals showing the new employee around the company, 400 employee benefit programs, 150 reports to employees and stockholders, 100 annual reports to employees, 400 special company publications, 75 suggestion systems, 50 safety programs, and 250 supervisory manuals and bulletins on training. All of these items will be filed in the AMA library at the New York headquarters office.

Much improvement is noted in company publications, with a notable trend away from the plant gossip type of editorial content, and more space and attention devoted to the serious side of plant operations and institutional prestige.

---

**"American Standards."** A list of 864 standards approved for national use of industry by the American Standards Association has been prepared by the association. The revised list of standards includes many of those developed under war procedure and now approved for peacetime use, and is being made available to interested trade, technical, and governmental bodies and individuals without charge.

The standards listed include definitions of technical terms, specifications for metals and other materials, methods of work, and methods of test for finished products. They reach into every important engineering field and also include standards dealing with public and industrial safety, industrial medicine, and a wide variety of consumer goods. Copy of "American Standards" 4701 giving list prices of the various standards is available by writing to the American Standards Association, 70 E. 45th St., New York 17, New York.

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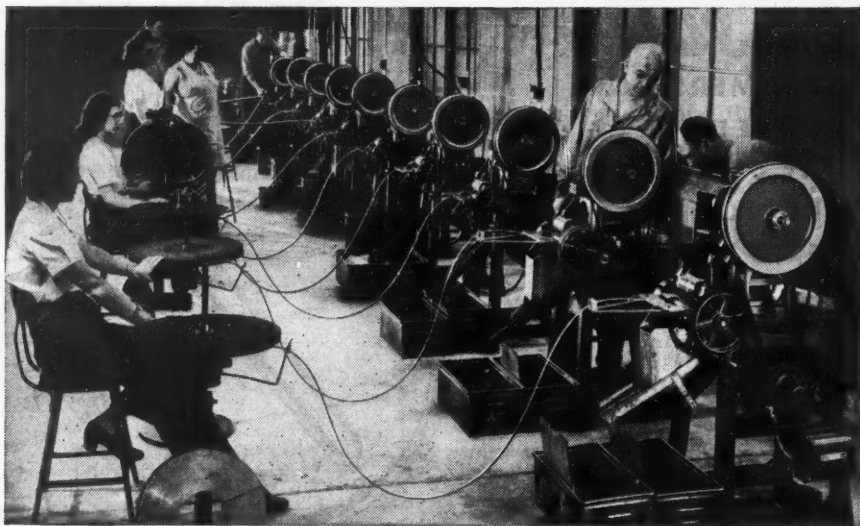
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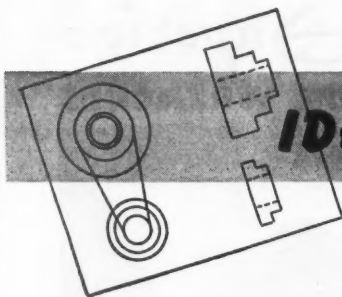
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## IDEAS FROM READERS

### Novel Tool Cabinet

By

EDWARD CHRISTOPHER AND GABRIEL PARODI

Manufacturing and Repair Department  
Westinghouse Electric Corporation  
Los Angeles, California

**T**HE tool cabinet shown in the accompanying illustrations was designed and constructed to meet the need for a cabinet which when opened would provide a mechanic with a full view of his tools. In addition to the

full, unobstructed view feature, the cabinet is constructed in a manner which provides that each tool is readily accessible. Fig. 1 shows a view of the cabinet closed while Fig. 2 shows it with the doors open.

Each door of the cabinet consists of one-half of the front and one side of the cabinet and is fitted with hooks and shelves on which tools can be hung or placed; the back and center panel are fitted to hold the heavier tools. The center panel braces the back while the doors are fitted with

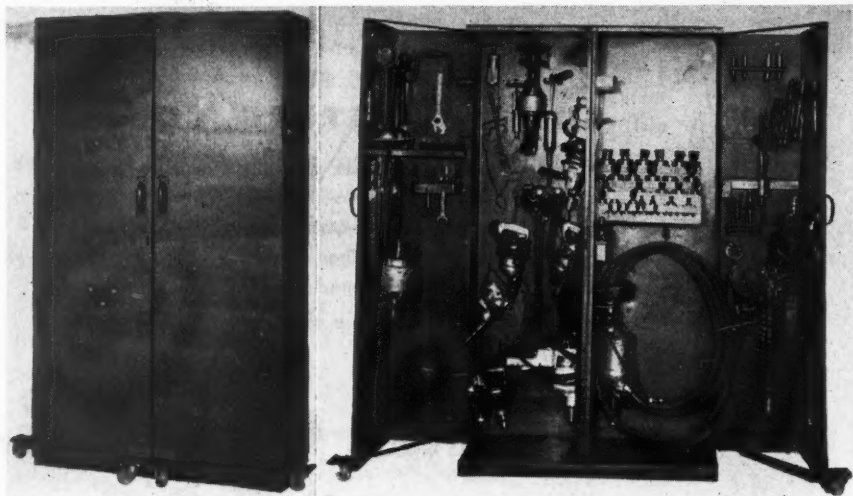


Fig. 1—(Left) Tool cabinet with doors closed.

Fig. 2—(Right) Tool cabinet with doors open.

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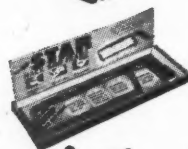
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braces at the top and bottom. Each door is provided with two casters which support the hinges and the door itself.

Aside from having the tools readily accessible, the cabinet has the advan-

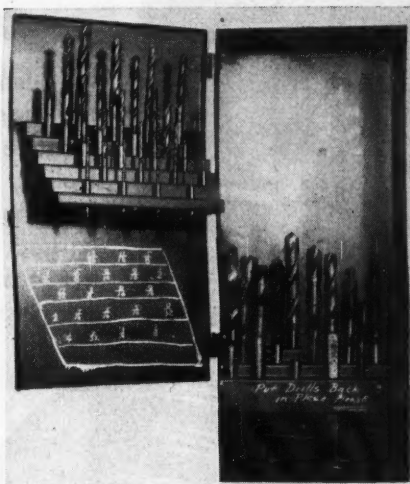


Fig. 3—Special drill storage cabinet.

tage that neither tools nor junk can be placed on the floor because of the bottom brace on each door.

Fig. 3 shows a small special drill cabinet that can be located on one of the doors. This small wall cabinet has the drill sizes charted so that there need be no "hit and miss" method of choosing the desired drill.

## Cutting Groove in Special Arbor

By C. W. KNEFF

**T**HE drawing illustrates the design of a special arbor that was produced in our shop, the feature of which was that it was pinned to a rectangular block in such manner that the ar-

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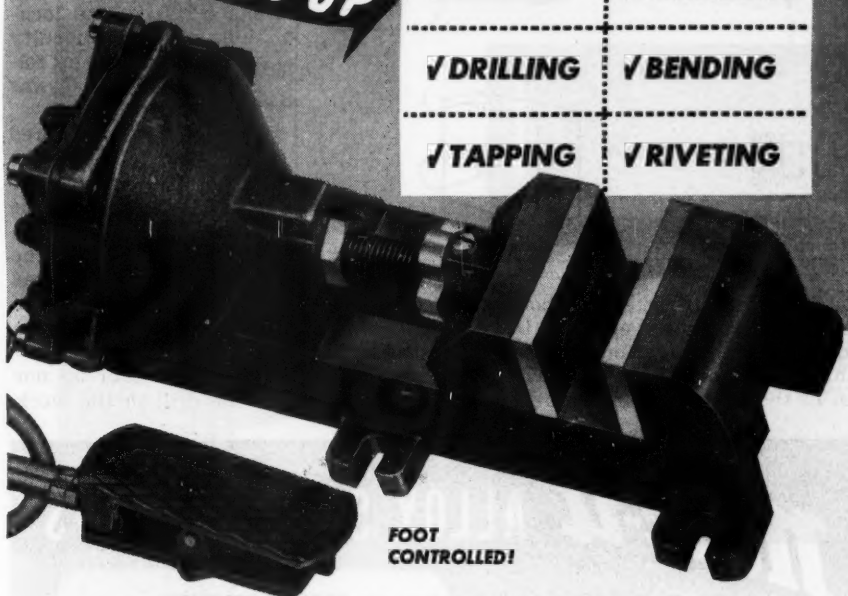
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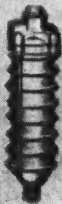
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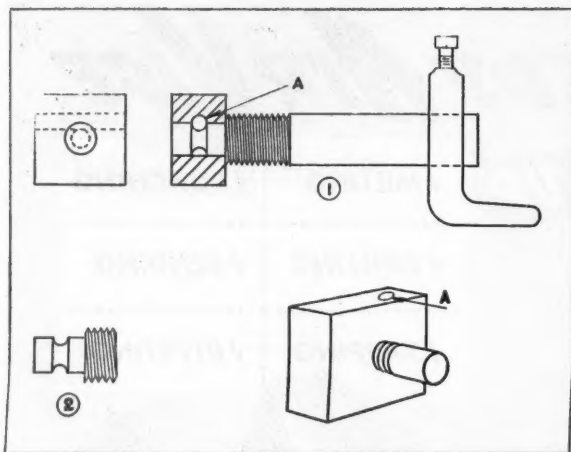
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Drawing illustrating method of cutting groove in arbor by use of drill.

groove proved troublesome as it had to be exact in size and location, but the difficulty vanished when the following method was utilized.

The block was bored to an exact fit on the arbor, then the arbor was inserted and the assembly was set up in a drill press and the hole A, Fig. 1, was

bored so that half the hole was in the block and half in the arbor. Then the drilling machine spindle was clamped so that it could move neither up nor down and, with the drill in the work

drilled so that half the hole was in the block and half in the arbor. Then the drilling machine spindle was clamped so that it could move neither up nor down and, with the drill in the work

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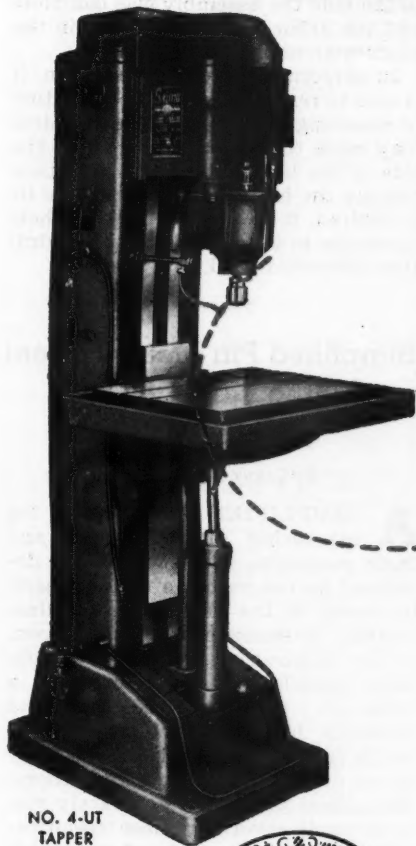
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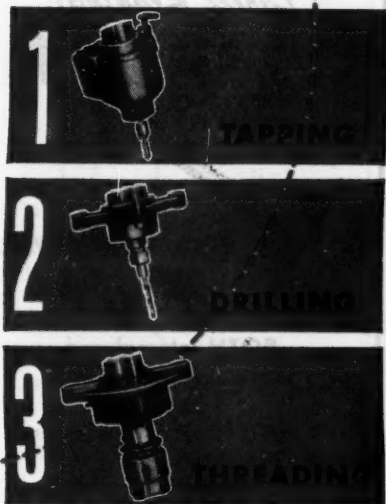


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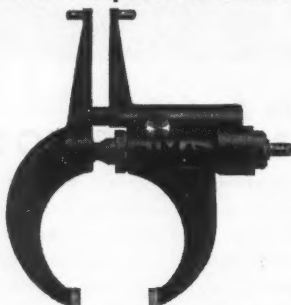
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and running at high speed, the arbor was slowly rotated. The spiral cutting edges of the drill cut a groove which proved to be an exact fit. The groove is shown in Fig. 2.

When the locking pin was driven into the hole the assembly was complete and the arbor could be rotated in the block with no end play evident.

In performing such an operation, it is well to remember that the operation of revolving the arbor against the drill may cause the drill to bear against the side of the hole in the block and thus enlarge the hole slightly. If a close fit is desired, it is well to drill the hole undersize in the first drilling and drill it to size afterward.

## Simplified Pin Measurement Method for Gibs and Dovetails

By LARRY H. GEORGE

**A** SIMPLIFIED pin method for measuring gibs, dovetails, and their respective slides which was developed by the writer, a tool engineer, is shown in the accompanying illustration. By means of the table, shown in the illustration, relatively complicated calculations are reduced to a minimum. Since tapered gibs and dovetails have only oblique angles which cannot be measured directly by means of a simple reading, the general shop whose job it is to accurately machine parts involving these specifications will find the table of invaluable assistance.

The measuring pins are cylindrical in shape and in use are selected for a diameter size which will permit the point of contact C to occur at a suitable distance from the corners of the gibs or dovetails. For work which requires average precision, measuring pins made of cold rolled steel can be used. However, for work of high pre-

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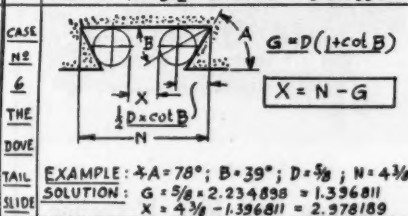
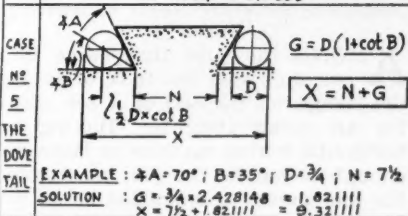
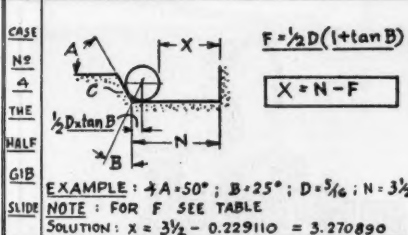
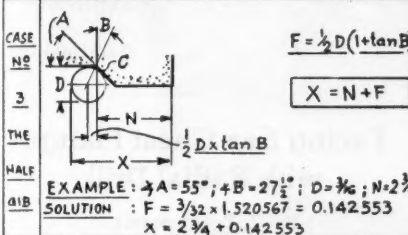
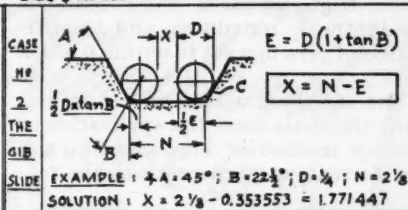
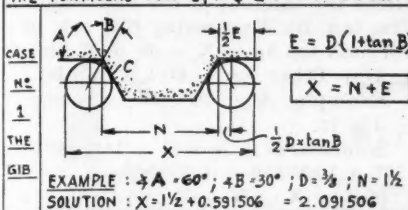
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# SIMPLIFIED PIN MEASUREMENTS FOR GIBS AND DOVETAILS

NOTE: GIVEN ARE  $\angle A$  & THE DIA. OF PINS —  $\angle B = \frac{1}{2} \angle A$  IN ALL CASES — WANTED  $X$   
THE FORMULAS FOR  $E, F$  &  $G$  APPLY FOR ANY PIN SIZE & ANGLE



## CONSTANTS FOR CALCULATING ABOVE CASES OF COMMON ANGLES & STD. PINS

PIN DIA.	E			F			G		
	$\angle A = 45^\circ$	$50^\circ$	$60^\circ$	$\angle A = 45^\circ$	$50^\circ$	$60^\circ$	$\angle A = 45^\circ$	$50^\circ$	$60^\circ$
$\frac{3}{64}$	0.066291	0.068733	0.073939	0.033146	0.034367	0.036969	0.160041	0.147399	0.128065
$\frac{1}{16}$	0.088388	0.091644	0.098584	0.044194	0.045822	0.049292	0.213388	0.196532	0.170753
$\frac{5}{64}$	0.110485	0.114555	0.123230	0.055243	0.057277	0.061615	0.266734	0.245665	0.213442
$\frac{3}{32}$	0.132582	0.137466	0.147876	0.066291	0.068733	0.073938	0.320081	0.294797	0.256130
$\frac{1}{8}$	0.176777	0.183288	0.197169	0.088388	0.091644	0.098584	0.426776	0.393063	0.341507
$\frac{5}{32}$	0.220971	0.229110	0.246461	0.110485	0.114555	0.123230	0.533469	0.491330	0.426884
$\frac{3}{16}$	0.265165	0.274932	0.295753	0.132582	0.137466	0.147876	0.640163	0.589595	0.512260
$\frac{1}{4}$	0.353553	0.366376	0.394337	0.176777	0.183288	0.197169	0.833550	0.786127	0.683014
$\frac{5}{16}$	0.441942	0.458221	0.492922	0.220971	0.229110	0.246461	1.066938	0.982461	0.853767
$\frac{3}{8}$	0.530330	0.549865	0.591506	0.265165	0.274932	0.295753	1.280325	1.179190	1.024521
$\frac{7}{16}$	0.618718	0.641509	0.690091	0.309259	0.320757	0.345045	1.493713	1.375722	1.195274
$\frac{1}{2}$	0.707107	0.733153	0.788675	0.353553	0.366376	0.394337	1.707101	1.572253	1.366028
$\frac{5}{8}$	0.883883	0.916441	0.985844	0.441942	0.458221	0.492922	2.133876	1.965322	1.707335
$\frac{3}{4}$	1.060660	1.099729	1.183012	0.530330	0.549865	0.591506	2.560651	2.358380	2.049042
1	1.414213	1.466306	1.577350	0.707107	0.733153	0.788675	3.414201	3.144507	2.732056
$1\frac{1}{4}$	1.767767	1.832882	1.971687	0.883883	0.916441	0.985844	4.267752	3.930644	3.415070
$1\frac{1}{2}$	2.121320	2.199459	2.366025	1.060660	1.099729	1.183012	5.121302	4.716760	4.098084
2	2.828427	2.932412	3.154700	1.414213	1.466306	1.577350	6.828403	6.289014	5.464112

cision it is mandatory to use pins made of high speed steel, hardened, accurately ground and lapped according to Bureau of Standards specifications. High precision work demands straightness, roundness, and identification of pins in a set to within 0.00002 inch.

The six illustrations which accompany the table show the application of the pin method of measurement and the derivation of respective case for-

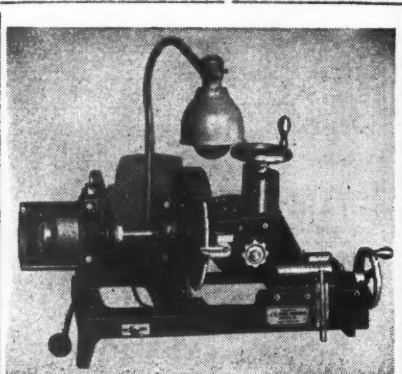
mulas. To compute the dimension  $X$  in case No. 1 simply add  $E$  to  $N$ . The value of  $E$  will be the sum of the diameter of pin  $D$  and the product of  $D$  times the tangent of the half angle  $A$  (i.e.  $\tan B$ ). Expressing this rule in a formula we have  $X = N + E$  and  $E = D + D \tan \frac{1}{2}A = D(1 + \tan B)$ .

Example:  $A = 60^\circ$ ;  $D = \frac{3}{8}$  in.;  $N = 1\frac{1}{2}$  in.

Solution:  $E = \frac{3}{8} \times (1 + \tan 30^\circ) = .375 \times 1.577350 = 0.591506$

Hence:  $X = N + E = 1.5000$   
 $+ 0.591506$

2.091506 in.



Patent Applied For

### Sharpen Dull Pipe Wrenches

Industries save hundreds of dollars.  
Some "wrench shops" make \$50 a day.

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### Facing Sea Chest Flange with Radial Drill

By C. T. GOODGAME

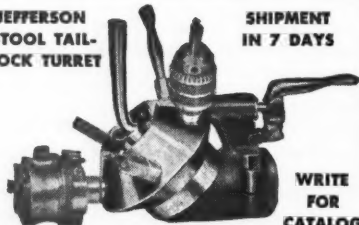
Pascagoula Shipyards, Ingalls Shipbuilding Corporation

**A**MONG the jobs that came into our shop was the task of facing the flange on the end of a sea chest for an ocean freighter. Having no horizontal boring machine or lathe big enough to handle the job, we devised the tool shown in operation in the accompanying illustration.

The sea chest was set up on the base of a large Carlton radial drill and a tool was devised to fit into the spindle of the drill. The tool consisted of a vertical shaft ground to a center at the bottom end with a shank at the upper

JEFFERSON  
5-TOOL TAIL-  
STOCK TURRET

SHIPMENT  
IN 7 DAYS



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JEFFERSON MACHINE TOOL CO.,

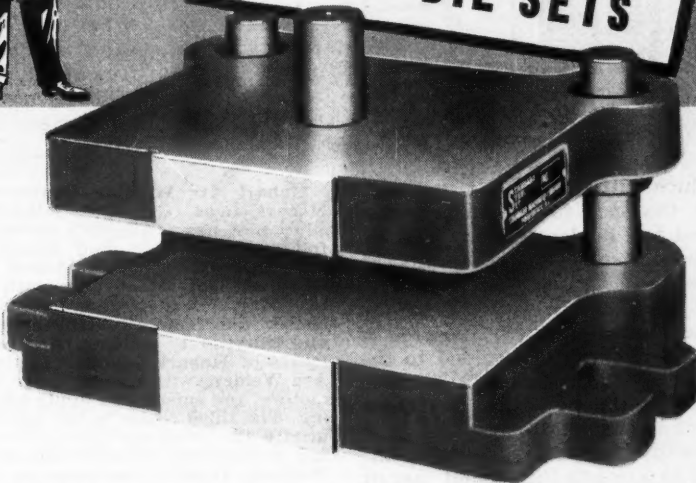
6" PLAIN DIVIDING HEAD  
IMMEDIATE DELIVERY



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 ALL STEEL DIE SETS



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BUILT for the same long, productive service as the universally used "Standard" Power Presses.

Set up your dies only once — the first time — in a "Standard" All-Steel Die Set. Then they'll be ready every time the job is repeated. Used with any make of press — sizes to fit your needs. Prompt shipment offered on all catalog sizes. Write for catalog.

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Lindco, Incorporated  
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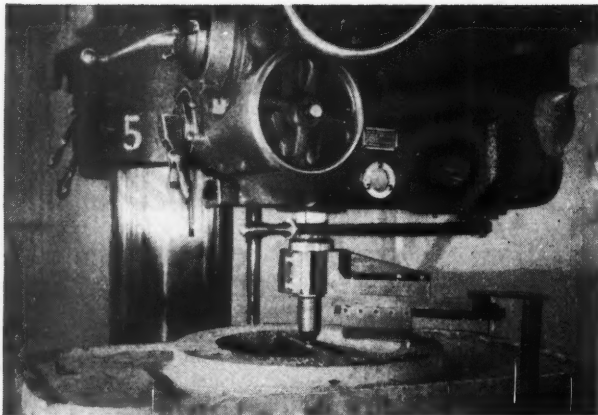


Fig. 1 — Setup Showing Method of Facing Sea Chest Flange

end which fitted into the machine spindle. Clamped to this shaft was a star feed tool holder carrying a  $\frac{1}{8}$  in. high speed steel cutter and with the star feed projecting so that it could be tripped with each revolution of the machine spindle. The trip consisted of a short horizontal rod welded to the top of a heavy bar which was clamped vertically to the side of the sea chest as shown in the illustration.

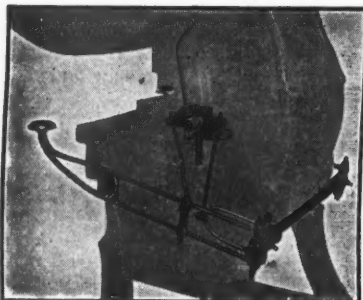
To steady the tool, a hexagon bar was cut to a length that would just fit into the bore of the flange. Then a center-hole was made in the center of the bar and the bar was welded in the center of the bore in the flange. With the tool center seated in the center of the bar and the tool bit set for the de-

sired dept of cut, the operation proceeded.

An excellent job is produced and within reasonable limits as to cost. When the operation was finished, the hexagon bar was easily removed from the flange.

**Hobart Arc Welding Equipment.** The Hobart Bros. Co., Box DM-738, Troy, Ohio, now has available a series of three folders illustrating and describing its various arc welding equipment and accessories. One folder deals with the Hobart Multi-Range Arc Welder with dual control and remote control for both light and heavy duty welding. Another folder treats of Hobart Gasoline Engine Drive Arc Welders with ample power for tools, motors, and emergency lights while welding. The third folder in the series covers briefly the company's line of arc welding accessories; Hobart School of Arc Welding; Hobart Generator for coupling to gas engine; and various books and literature on arc welding. Copies of either or all folders are available free.

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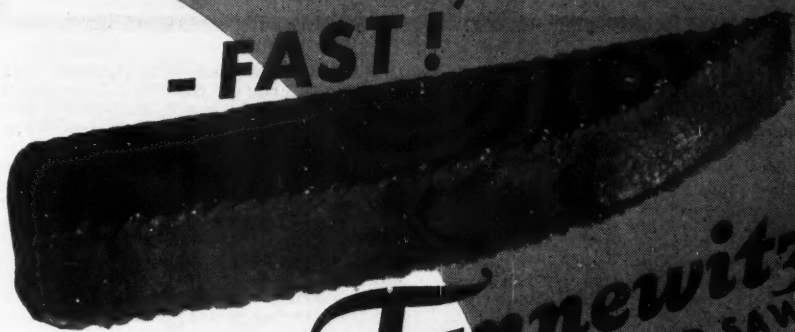
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BROOKLYN, N. Y.



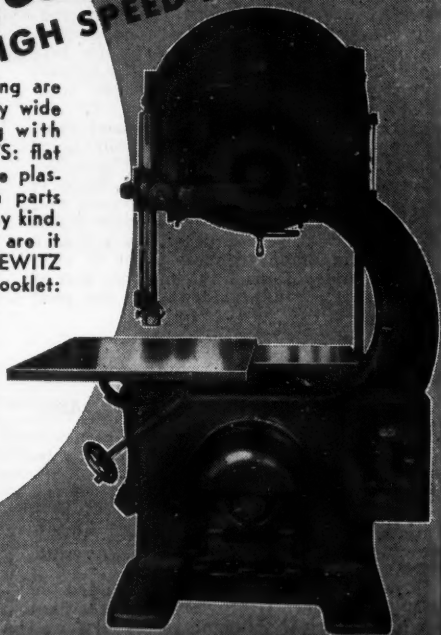
*for Sawing METAL as HARD as a FILE  
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Speed Band Saw.

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Cost reductions that are downright amazing are effected in the cutting of an extremely wide variety of materials by friction sawing with TANNEWITZ HIGH SPEED BAND SAWS: flat sheets, hardened or soft steels, armor plate plastics, and many others. Formed aluminum parts can be trimmed without using a rest of any kind. Whatever your cutting problem, chances are it can be done faster and better with TANNEWITZ HIGH SPEED BAND SAWS. Write for booklet: "FRICTION SAWING."



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# News of the Industry

## Plomb Tool Acquires J. R. Danielson Company Factory

Acquisition of the J. P. Danielson Company factory in Jamestown, N. Y., for the manufacture of pliers, adjustable wrenches and pipe wrenches, has been announced by the Plomb Tool Company, Los Angeles. The new plant provides additional tool manufacturing facilities in the East where Plomb's business has expanded rapidly during the past ten years. Plomb's two plants in Los Angeles are now supplemented by factories in Chicago, Jamestown and Portland, Oregon.

The Jamestown plant currently is making six pipe wrenches, eleven adjustable wrenches, and twenty-six pliers, including thin jaw, bent nose, diagonal, brake spring, battery, needle nose, duck bill, ignition, wrench, water pump, side cut, slip joint, universal, gas, telephone, line-man's and combination types.

Established in 1906, the Danielson plant is one of the outstanding producers of quality tools in the country. It employs about 240 people in a modern factory, with excellent machinery, equipment and tooling. The factory includes about 84,000 square feet and is situated on a 4-acre site. Management of the plant is continuing under John P. Danielson, son of the founder and president for the past six years.

## Magnolia Metal Acquires Evans Engineering

Arthur F. Miller, president of Magnolia Metal Company, 18 W. Jersey St., Elizabeth, N. J., recently announced the acquisition of the Evans Engineering Company, formerly of Milwaukee, Wisc., now located at 1478 Arcadian Avenue, Waukesha, Wisconsin.

Evans Engineering was founded in 1939 by Robert G. N. Evans, president and Arthur J. Huegel, secretary and metallurgist to produce a new type of sleeve bearing in which the lining or bearing metal is permanently "Fusion Bonded" to the backing or shell. In this unique process the bearing shell is completely formed and specially treated and

the bearing is then centrifugally spun into the interior of the shell. The resulting bond is so intimate and secure that no test has yet been found that will separate the two.

The Evans organization comprising its full complement of key personnel, with the exception of Mr. Evans who died in 1946, was taken over as a division of Magnolia during January of this year. With this division in operation, the Magnolia Metal Co., now offers its clients a complete bearing service—Magnolia supplying the bearing metal; Evans fabricating the complete bearing unit.

## Hydro-Line Manufacturing Company Formed

The Hydro-Line Manufacturing Company was recently formed in Rockford, Illinois. The new company will manufacture a complete standard line of both air and hydraulic cylinders as well as special cylinders of both types. The company will also design and manufacture special machinery and equipment.

The plant and offices are located at 711 Nineteenth Street, Rockford, Illinois. Messrs. G. A. Markuson, President; Gust J. Peterson, Vice-President and H. W. Johnson, Secretary, of the new company, were all formerly associated with the John S. Barnes Corporation of the same city. Ray O. Harding, Treasurer, is active in the management of several local industries.

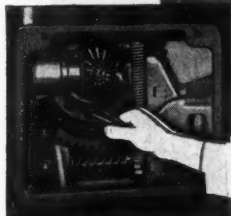
## Carbide Form Tool Department Created

An extensive carbide form tool department has recently been created by The Weldon Tool Company, 3000 Woodhill Road, Cleveland, Ohio. This new department is said to be fully equipped for the production of any type, size or quantity of ground carbide form tools either flat or circular, in a practically unlimited range of shapes. The department is self contained with all necessary equipment for brazing and grinding.

# SAVE TIME WITH THE GREENLEE "6" AUTOMATIC SCREW MACHINE



**NO CAMS FOR MAIN TOOL SLIDE.  
YOU CAN RESET THE STROKE  
IN LESS THAN 5 MINUTES...**



Here is a close-up showing how the main tool slide stroke is set by an adjustable dog on the worm wheel.

**EASY TO GET AT.** Main tool slide setting on the GREENLEE "6" is unique in its simplicity, accuracy, and speed of adjustment. Instead of the conventional barrel cam or similar arrangement, the GREENLEE has a worm and worm wheel drive to a special rack and pinion mechanism. The length of the feed stroke is controlled by a single adjustable dog on the worm wheel. By simply removing a cover plate and resetting this dog on a graduated scale... the work of only a few minutes... the point where cutting feed starts can be quickly and accurately set. This important GREENLEE

feature goes a long way to reduce set-up time between jobs. Many other distinctive features make the GREENLEE "6" the Operator's Favorite.



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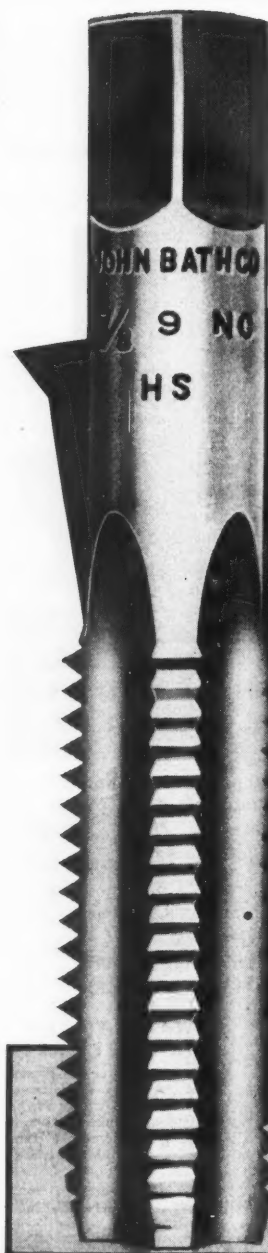
Send for a copy of this 20-page book explaining all Greenlee "6" features. Ask to see our 30-minute sound movie showing building of a Greenlee "6" from foundry to finished machine.



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MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES • AUTOMATIC SCREW MACHINES • AUTOMATIC TRANSFER PROCESSING MACHINES

# Bath Taps




If the work is "tough going" and you need a dependable tap --- put a Bath Tap on the job for satisfactory results.

Bath Taps are precision ground from hardened steel. They provide clean, accurate cuts at high speed.

Specify Bath Taps for long life and accuracy.

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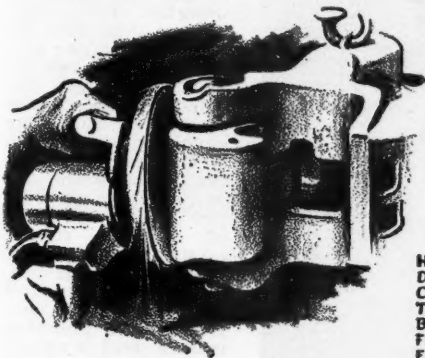
# Abrasives for BAR POLISHING



THE CHANCES ARE THAT SPECIALLY-PROCESSED JEWEL NATURAL GARNET WAS THE "SANDING" MEDIUM THAT BROUGHT OUT THE FULL, MELLOW BEAUTY OF THIS WOODEN BAR. NATURAL GARNET HAS LONG BEEN NOTED FOR ITS UNIQUE ABILITY TO BRING OUT ALL THE LATENT BEAUTY OF WOOD, AND JEWEL GARNET COMBINES THIS ATTRIBUTE WITH THE ABILITY TO DO IT FAST.



AND THIS BAR GOES INTO A TYPE-WRITER. IT HAS TO BE EXACTLY THE RIGHT THICKNESS. SMALL, FINE DISCS OF JEWEL ABRASIVE GRIND THESE DELICATE TYPE BARS TO A PRECISION FIT, EVENLY, QUICKLY AND SMOOTHLY... AND TO SPLIT-THOUSANDTHS OF AN INCH ACCURACY.



HERE'S STILL ANOTHER KIND OF BAR—CALLED A DRAW BAR. THIS IS THE HIGHLY IMPORTANT COUPLING MEMBER THAT FASTENS RAILWAY CARS TOGETHER. CALCULATE THE STRENGTH THESE BARS HAVE TO HAVE IN ORDER TO PULL 130 FREIGHT CARS, EACH WEIGHING 30 TONS AND EACH LOADED WITH 40 TONS MORE. WELDISKS GRIND THESE HARD, TOUGH FORGINGS QUICKLY AND SAFELY.

Remember Jewel Abrasives next time you order from your jobber. There's a Jewel product for every grinding and polishing job.

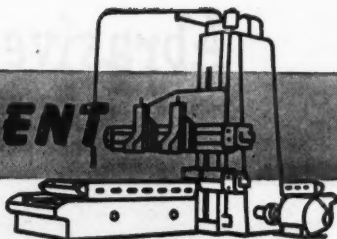


## Abrasive Products, Inc.

SOUTH BRAINTREE 35, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES



## NEW SHOP EQUIPMENT



### Hardinge Multi-Operation Chucking Machine

To meet the need for a precision chucking machine with capacity for large diameter pieces and capable of producing work to accuracy heretofore associated only with smaller diameter work, Hardinge Brothers, Inc., Elmira, N. Y., has brought out a multi-operation chucking machine designed for turning, boring, or threading parts up to 6 inches in diameter which have been blanked out on automatic screw machines or turret lathes

or for finishing stampings, castings, forgings, and many other types of work that ordinarily require many individual setups. Typical examples are the many parts requiring threads to be cut concentric with turned or bored diameters, as well as square and true with shoulders on the work.

According to the manufacturer, parts requiring many bored diameters and turned diameters that must be relatively concentric, as well as having a fine finish, can be produced on a rapid production basis with the Hardinge Multi-Operation Chucking Machine.

The headstock spindle has a speed range of 150 to 3,000 r.p.m. in either the forward or reverse direction. The spindle is designed to accommodate standard 5C collets, providing a 1-inch round collet capacity through the spindle. Step chucks provide for collet-like chucking of work up to 6 inches in diameter. Through the use of two, three, or four-jaw chucks, odd shaped castings, stampings, and forgings may be chucked.

The production threading head is controlled by a precision master lead screw mounted directly on the rear of the headstock spindle. There are no intervening

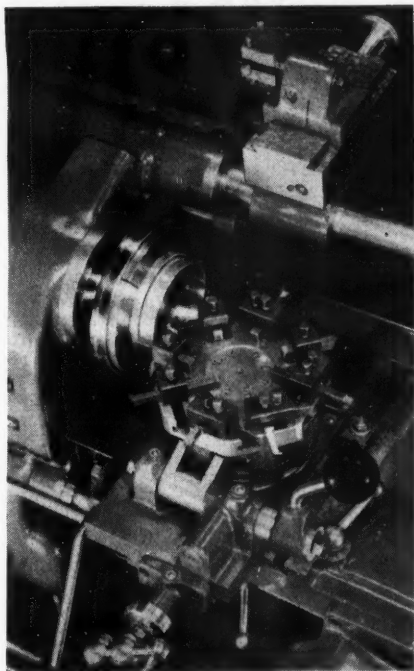


Hardinge Multi-Operation Chucking Machine



gears; consequently, accurate duplication of the lead screw is said to be assured. A thread length control provides for automatic lifting of the tool from the work at the end of the cut, thus eliminating the necessity of cutting a thread relief in the work. Threads can be cut within one-half turn from the shoulder.

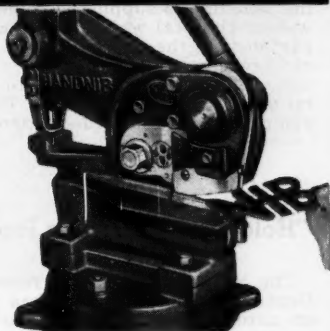
The bed has hardened and precision ground steel dovetail ways so that the



Close-up view of Hardinge Multi-Operation Chucking Machine set up to turn a large diameter part

forces resulting from the work cutting load apply a holding-down action which is claimed to eliminate chatter and vibration. The carriage of the machine is of generous proportion but yet sensitive enough to afford the operator an unusually fine "feel" for machining to precision tolerances. The carriage has a built-in cross feeding turret which permits the work to be bored, turned, and faced from the turret with extremely short length tooling. The turret can be either screw or lever fed, and has eight

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**THE HANDY MAN**  
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# HANDNIB

- OUTSIDE NIBBLER • SHEAR
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- ROD CUTTER

● Imagine! One tool that can be used *five* different ways. This most versatile of the Heinrich line is Heavy Duty Handnib No. 5. It's a toolmaker's delight, for it eliminates hours of tedious hand-work in making templates and trial blanks of any shape desired. In addition to its nibbling (outside and inside) and shearing of steel up to 3/16" thick, the No. 5 Handnib punches up to 1/2" holes through 1/8" stock and cuts drill rods or round stock up to 3/8" diameter. Write today for folder giving full details on this and other Handnib models.

**NATIONAL MACHINE TOOL CO.**

DEPT. 117-D • RACINE, WISCONSIN

stations, each of which can be adjusted without affecting other turret stations. The turret is designed to accommodate standard  $\frac{3}{8}$ -inch square tool bits or  $\frac{3}{4}$  x  $\frac{3}{4}$ -inch rectangular tools directly on the hardened and ground steel top surface. Through the use of single, double, and triple toolholders, as many as 24 single-point tool operations can be performed in one setup.

The Hardinge Multi-Operation Chucking Machine is supplied complete with a welded pedestal which has a motor compartment in the left-hand side and a tool storage compartment in the right-hand side. The coolant facilities are an integral part of the pedestal base. The coolant pump is individually motorized.

combination drill and countersink one  $\frac{1}{4}$ -inch hole; countersink 14 holes ranging from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch; tap 15 holes ranging from  $\frac{3}{8}$  to  $\frac{1}{4}$ -inch tap; drill a 19/32-inch diameter oil gallery hole through engine block in 12 consecutive successive steps; and tap both ends of oil gallery  $\frac{3}{8}$ -inch pipe tap.

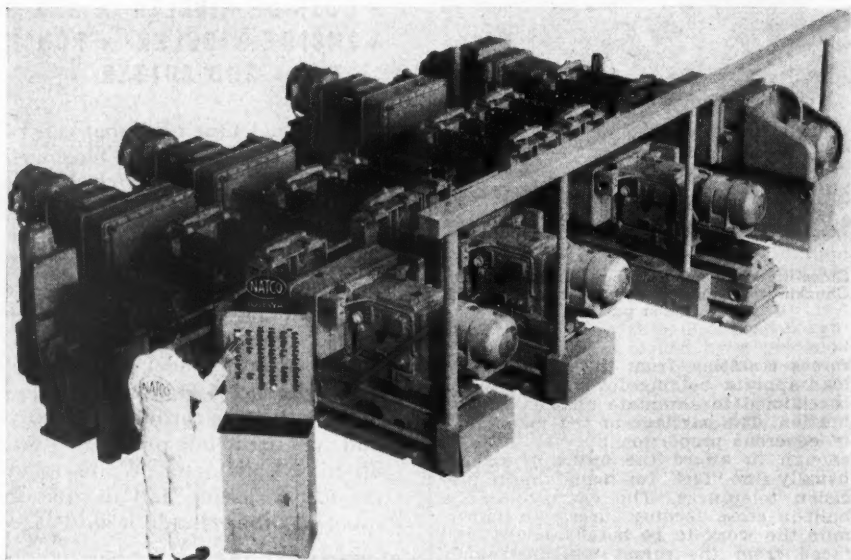
In completing the above operations, the machine is said to provide for automatic control, thus necessitating the employment of but one operator. The unit is designed to automatically advance the engine blocks from station to station, clamp and unclamp them in each position, and synchronously perform the operations at all stations as the blocks travel through the machine. At the completion of all operations, the blocks are automatically ejected into a roller conveyor.

### "Holeway" Automatic Processing Machine

The National Automatic Tool Co., Inc., Dept. 27, Richmond, Ind., has developed an automatic processing machine which is said to be capable of producing 90 engine blocks per hour. Known as the "Holeway," the machine incorporates 19 stations and is arranged to completely drill 23 holes ranging from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch;

### Landis Type C Hydraulic Crankshaft Regrinders

The Landis Tool Co., Waynesboro, Pa., announces the addition of 18 x 30 and 18 x 42-inch crankshaft regrinders to its present line of five sizes of Type C regrinders. The 18 x 30-inch unit is designed to handle Ford, Studebaker Champion,



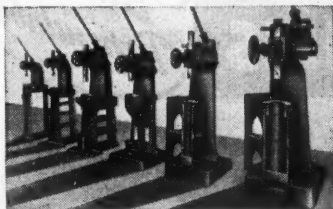
"Holeway" Automatic Processing Machine



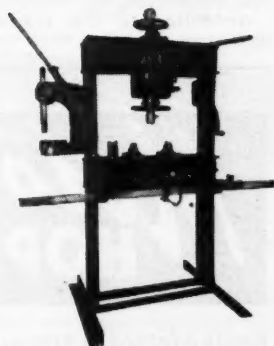
**DAKE** is the name to remember when ordering arbor presses.

All Dake Arbor Presses are built to quality standards. Every Dake Arbor Press is made with square ram for longer life... each press has the extra weight, scientific bracing, machined table, and accurate balancing that have made Dake models so popular.

Your production or maintenance departments can now obtain prompt delivery on most Dake Arbor Press models. Send your inquiries or orders direct to Dake Engine Company, Grand Haven, Michigan... or mail the coupon below for complete Dake catalog.



The Dake line includes simple and compound lever presses, hydraulic presses, and miscellaneous models for special jobs. 1 to 75 tons.



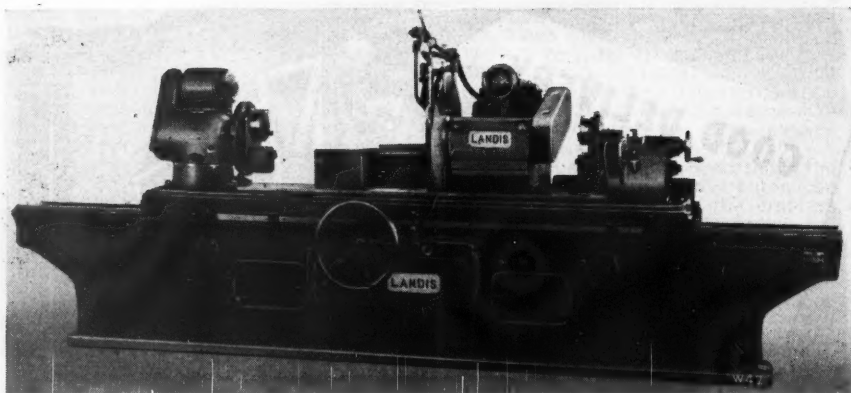
Dake 50-ton hydraulic press with extras. A rugged, powerful press for heavy-duty work.

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Dake Engine Company  
612 Seventh Street  
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Please mail me a copy of the latest Dake Arbor Press Catalog.

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Landis 18 x 66-Inch Type C Hydraulic Crankshaft Regrinder

and Willys crankshafts, while the 18 x 42-inch machine can be used to grind Chevrolet, Plymouth, and other six-cylinder passenger car and light truck crankshafts.

According to the manufacturer, the new sizes, together with the 18 x 66, 22 x

76, 22 x 88, 25 x 126, and 40 x 216-inch units already in the line, provide machines for regrinding crankshafts for all classes of passenger cars, trucks, and large marine or locomotive Diesels. Each machine in the line features Microsphere wheel spindle bearings; dynamic balance-

## Motorized HOPPER UNITS

*Speedy  
Sturdy  
Dependable*

*Easily adapted to presses, centerless grinders, thread rolling and slotting machines or special machines.*

### FEEDS PARTS WITH SURPRISING EFFICIENCY

Screws, Screw Blanks, Rivets, Pins, Discs, Nuts, Bearing Rollers, Steel Balls, Washers, and special parts adaptable to hopper.

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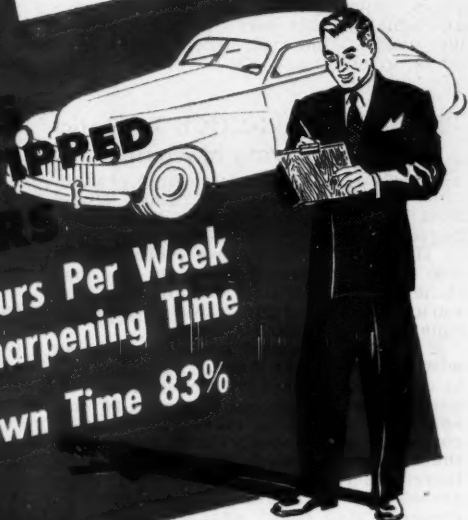
**DETROIT POWER SCREWDRIVER CO.**

2807 West Fort Street,  
Detroit 16, • Michigan.

FIELD REPORT  
ON TOOL PERFORMANCE

**STAPLES  
CARBOLOY-TIPPED  
REAMERS**

✓ Saved 12 Hours Per Week  
Tool Resharpener Time  
✓ Reduced Down Time 83%



... On Multiple Reaming of Valve Tappet Guides

To ream valve tappet guide holes in cylinder blocks, an automotive manufacturer used a multiple tool set-up of six H.S.S. reamers. Eight hours running time was the maximum production rate possible before reamers became dull and required resharpener.

At the recommendation of Staples Tool Engineers, the six H.S.S. reamers were replaced with special Staples Carboloy-tipped Reamers. As a result, tool resharpenings were reduced from five times a week to *once a week!* Prior to this changeover, the manufacturer had accepted the high tool cost as a production necessity on jobs of this type.

By replacing H.S.S. tools with Staples Carboloy-tipped Tools on routine as well as complex hole cutting operations, many manufacturers have reduced tool costs, improved tool performance and have eliminated frequent down time. *Your* production may also benefit. Call in a Staples Tool Engineer for an on-the-job demonstration. There is no obligation.

**THE STAPLES TOOL COMPANY**  
CINCINNATI 25

*Distributors in Major Cities*

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**Staples**

**CARBOLOY-TIPPED CIRCULAR CUTTING TOOLS**

REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS •  
SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS



ing of rotating parts; variable voltage headstock drive; micrometer wheel feed for accurate sizing; two-speed hand traverse, with hydraulic power traverse available on order; and equipment to permit plain cylindrical, taper, face or internal grinding.

### "Red Ring" Model GCS Turmatic Gear Shaving Machine

Especially engineered for high production operations, the "Red Ring" Model GCS Turmatic Gear Shaving Machine illustrated herewith has been brought out by the National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich. The machine has two cutting stations and four work stations and incorporates the principle of crossed-axes shaving.

A central four-sided turret is equipped with four sets of head and tailstocks to carry work gears with their axes vertically. Two cutter heads spaced 90 deg. apart automatically move the shaving cutters simultaneously into mesh with their respective work gears on adjacent turret faces. These cutters traverse across the work gear faces similar to present "Red Ring" shavers.

After completing the cutting cycle, the cutter heads automatically back out of mesh and the turret indexes 180 deg. to present two fresh gears to the cutters. Actions of both turret and cutter heads are fully automatic as long as each work station is properly loaded with a gear of the proper size. Thus, at any one time, two turret stations are free for unloading and loading while the work on the two remaining stations is being shaved. As a result, cutting proceeds almost continuously. The time between the completion of one cutting cycle and the beginning of the following cycle is approximately four seconds while the turret is indexing and meshing is taking place. Both loading stations are fully accessible and are situated at the most convenient height for the operator.

Automatic meshing of the cutter and work gear is effected by a cutter locator and a nosepiece which positions the gear teeth when loading. The nosepiece also serves to reject oversize gears, thus precluding the necessity of opening and closing guards or reaching around the work gear in order to correctly position it.

Both head and tailstock employ integral tooling or 60-deg. center points, thereby eliminating the necessity of load-

## SAVAGE NIBBLING MACHINE

FOR FAST ACCURATE CUTTING OF  
FLAT SHEETS BY TEMPLATE OR TO  
A SCRIBED LINE-TUBE SLOTTING  
AND SHAPING

Sheets	Tubing
Flat mild $\frac{3}{16}$ "	Wall thickness to $\frac{3}{16}$ "
Tough alloys $\frac{1}{8}$ "	1" I.D. to 36" O.D.

### "NIBBLE YOUR COSTS"

Low initial investment.

Eliminates expensive dies.

ASK FOR FREE BULLETIN "H"

Manufactured By

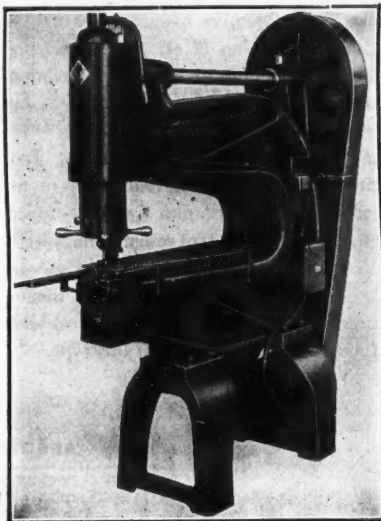
**W. J. SAVAGE COMPANY**

Since 1885

KNOXVILLE

TENNESSEE

Pioneer Manufacturers of Nibbling Machines





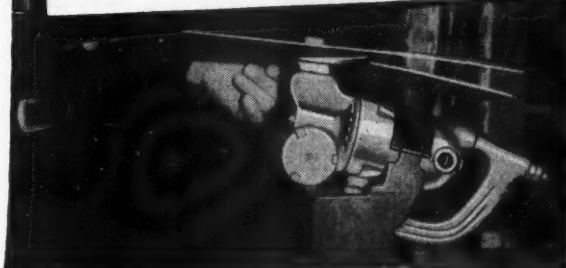
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Inside cuts easily  
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In the hand or on the bench the  
**UNISHEAR CUTS COSTS**



Base and bracket  
of bench cradle for  
Unishear are made of  
cast iron.

E

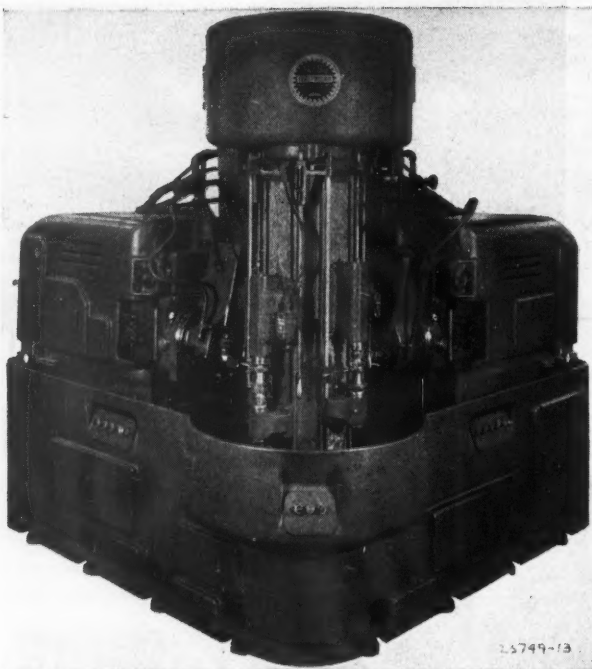
● UNISHEARS are real production tools for cutting metal. They can be used as portable units or in a cradle for bench use. Operator can follow straight lines, curves, angles and notches. Inside cuts easily made from 1" starting hole. Circular cutting attachment for radii 2 1/2" to 15". Blades may

be adjusted quickly and easily. Comfortable grip handle on all models. Note duplex handle on Mighty Midget, No. 16A and No. 214. Ask your distributor to show you how the Unishear cuts costs for his customers. Stanley Electric Tools, 137 Elm Street, New Britain, Conn.

**STANLEY**

Trade Mark

**HARDWARE · HAND TOOLS · ELECTRIC TOOLS**



**"Red Ring" Model GCS  
Turmatic Gear Shaving  
Machine**

lights furnish a constant warning to the operator that the machine is in operation.

Gears can be crown shaved on the machine, the amount of crown being variable by cam adjustment. No special cutters are required on the machine, which can be effectively used with the same cutters as employed on other Red Ring machines.

### **"Ceco-Drop" Gravity Drop Hammer**

ing separate arbors. The setting of the two cutter heads is mutually independent. In the case of cluster gears, both cutters may be set to shave two different gears, whichever is most desirable.

The machine incorporates a system of interlocks and safety devices so arranged that damaged cutters from oversize or improperly positioned work gears is claimed to be eliminated. In any such case, the machine automatically stops until the hazard is removed. Safety

The Chambersburg Engineering Co., Chambersburg, Pa., announces a gravity drop hammer to be known as the "Ceco-Drop." Air or steam is used to raise the ram and a simple, unique clamp holds the ram and rod at the top of the stroke. The clamp is released by means of an air valve which is actuated by the operator's foot treadle.

As a result of the speed of the Ceco-Drop, the metal can be forged at unusually high temperatures, with forgings ac-



### **ANNIS Production Type ELECTRIC ETCHER**

**SPECIFICATIONS**—Navy bronze contact plate; Aluminum alloy case 4" x 8" x 10"; Weight 22 pounds; Recessed, heavy duty heat selector switch and pilot light; Handy cord storage compartment; Special current regulating transformer gives smooth etching action with the offset, coolgrip stylus. For operation on regular 110-volt AC lighting circuits. Fully guaranteed. Price \$67.50. Immediate delivery.

**R. B. ANNIS COMPANY**

1107 N. Delaware St. Indianapolis 2, Ind.

**Save  
Time**

**Cut  
Costs**

**COMMERCIAL  
PRECISION  
SPECIAL  
Ground Thread Taps**

**PROMPT DELIVERY**

Many special as well as  
standard taps in stock.

Send for catalog on  
company letterhead.

**HY-PRO** Ground Thread Taps are today's watchword for economy. Accurately tapping six times as many holes as a cut thread tap at high speeds, these rugged precision tools require only about one-fifth the sharpening for the same number of holes, and are less easily broken.

Save time! Save costs! Effect definite savings and increase production by specifying HY-PRO Ground Thread Taps for every tapping job. You'll find they will stay on the job longer, maintain their size longer, and produce at a profit. HY-PRO..High Production at Low Cost.

*For High Production*



**TOOL CO.**

**New Bedford, Mass., U. S. A.**

# ACROHEX

BRANDING IRONS

for  
WOOD,  
PLASTICS,  
FIBRE,  
Etc.

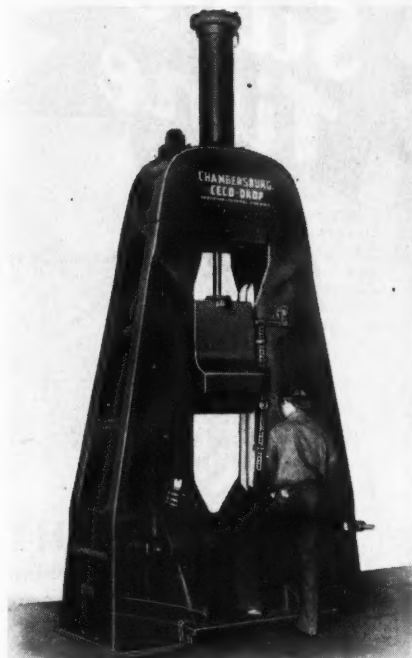


Ask About  
**HOT MARKING  
MACHINES**

The  
**ACROMARK**  
Company

9 Morrell St., Elizabeth 4, New Jersey

curately matched through the use of parallel, integral guides (electronically hardened), heavy frames, and a low center of gravity which is said to ensure against movement and vibration. The



"Ceco-Drop" Gravity Drop Hammer

stroke of the machine can be changed in a matter of seconds by means of a unique rocker arm with quickly adjustable dogs. A safety cylinder cover is said to eliminate the hazard of a broken rod.

According to the manufacturer, the Ceco-Drop is unusually easy to operate. The clamp cylinder is actuated by a pneumatic pilot valve on the operator's treadle. The feeding and working zone are clear, and treading is easily accomplished. The machine is available in rated sizes of from 50 to 20,000 pounds.

## Kaukauna Model 700 Indexing Table

Built to support heavy workpieces without deflection, an indexing table which can be readily adapted for use

# 3 Major Improvements

1. STRONGER RESIN BOND!

2. HEAVIER FIBRE BACKING!

3. SHARPER CUTTING ACTION!

**Now** ... Faster, more productive

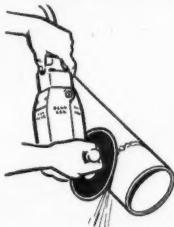
metalworking with the New **ARMOURCLAD RESIN FIBRE DISC!**



**Actual production tests** have proved that this new disc *cuts faster*. This greater initial rate of cut lowers production costs, reduces labor costs.



The new Armourclad Resin Fibre Disc *cuts faster longer* because its special resin bond gives better grain adhesion—greater resistance to heat and humidity.



**Better for all disc operations**, the new Armourclad Resin Fibre Disc is *especially good* for severe grinding jobs.

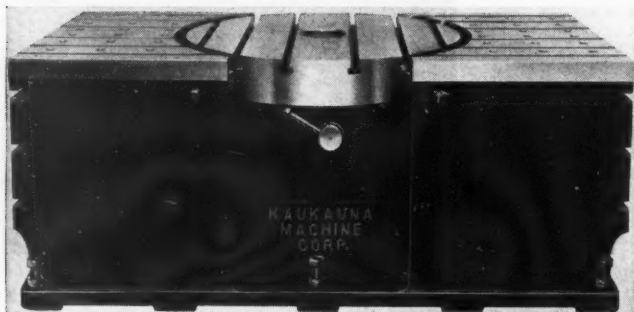


Look for This Label on the Green-Backed Disc

## ARMOUR *Sandpaper* WORKS

Division of Armour and Company

1355 West 31st Street, Chicago 9, Illinois



Kaukauna Model 700  
Indexing Table

with various machine tools is now being manufactured by the Kaukauna Machine Corp., Kaukauna, Wis. Designated as the Model 700, the table is also said to be ideally suited for inspection or layout work as a result of its unusual flexibility and rigidity.

The main bed of the Model 700 is of heavy well-ribbed cast iron construction, with T-slots provided in the top and at each end for clamping purposes. In this manner, work can be held in either a horizontal or vertical plane. Moreover, a setup can be made on one end of the

construction, is located in the center of the main bed and is supported by an extra capacity ball thrust bearing. The platen is manually operated and can be locked in any position. A hardened steel plunger and hardened steel bushings are said to assure positive indexing positions. T-slots are provided in the platen for use in clamping workpieces, and two easily adjusted shoes are furnished for clamping the platen firmly in position.

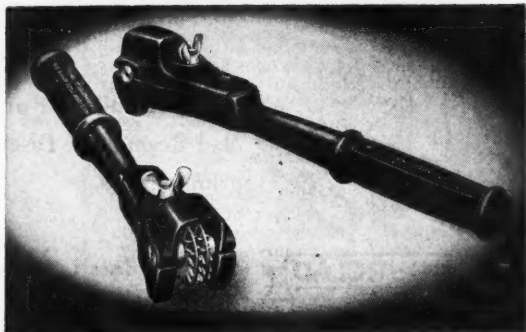
The Kaukauna Model 700 Indexing Table is 72 inches long x 36 $\frac{1}{4}$  inches wide x 29 inches high.

## GRINDING WHEEL DRESSERS



"They sure do  
a great job!"

CHAMPIONS pay off in top performance and tool economy. The patented-design assembly cap adds safety. Spindle bearings guide the cutters preventing wobbling and wear. Handle and cap last indefinitely, and mounting either Star or Corrugated Cutters, will give peak performance on any mechanical straight-face dressing job in the shop. For your best tool buy, always choose from the line of CHAMPIONS.



The **WESTERN** Tool and Manufacturing Co. Inc.  
SPRINGFIELD, OHIO

STOCKED BY LEADING  
INDUSTRIAL SUPPLY  
DISTRIBUTORS FROM  
COAST TO COAST.



WHATEVER THEY  
GET THEIR **TEETH** INTO

**CIRCLE**



**High Speed METAL SLITTING SAWS**  
*assure success!*

**QUALITY** is a tradition at Circular Tool and because it is, CIRCLE R HIGH SPEED METAL SLITTING SAWS, along with all CIRCLE R Metal Cutting Tools, are an unqualified success in whatever job they get their teeth into!

The finest materials available, the highest type of craftsmanship possible, these are the key factors that make CIRCLE R METAL CUTTING TOOLS coast-to-coast favorites in many industries.

Name your cutting or slitting problem. CIRCLE R has a tool for the job!

CIRCLE R Metal Slitting Saws are available in diameters from 1 1/4" to 10".

**CIRCULAR TOOL CO., INC.**

**PROVIDENCE 5, RHODE ISLAND**

CHICAGO • PHILADELPHIA • NEW YORK • DAYTON • CLEVELAND • LOS ANGELES  
ROCHESTER • INDIANAPOLIS • DETROIT • ST. LOUIS • MINNEAPOLIS

# Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

*Buy Kipp air tools for best results, lower prices.*

**MODEL JA  
50,000 R.P.M.**

**\$33<sup>25</sup>**

IN U.S.A.



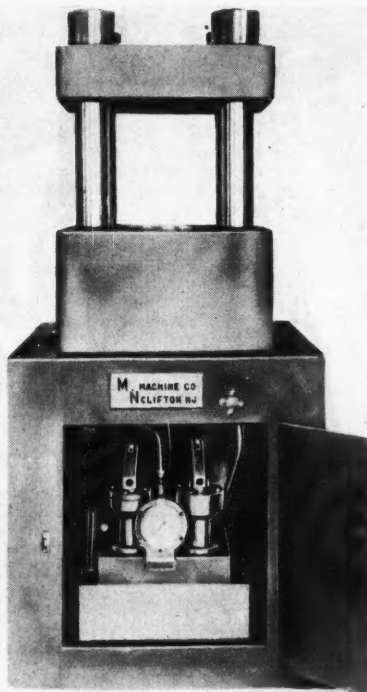
Weight 12 ounces;  
length 6¾ inches;  
chuck size ⅜ inch.  
Wheel guard re-  
moved for better  
illustration.

**MADISON-KIPP CORP.**  
208 Waubesa St., Madison, Wis., U.S.A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

## M & N Model M13A Hydraulic Hobbing Press

The accompanying illustration shows a hydraulic hobbing press of 200-ton capacity now being marketed by the M & N Machine Tool Works, 144 Orono St.,



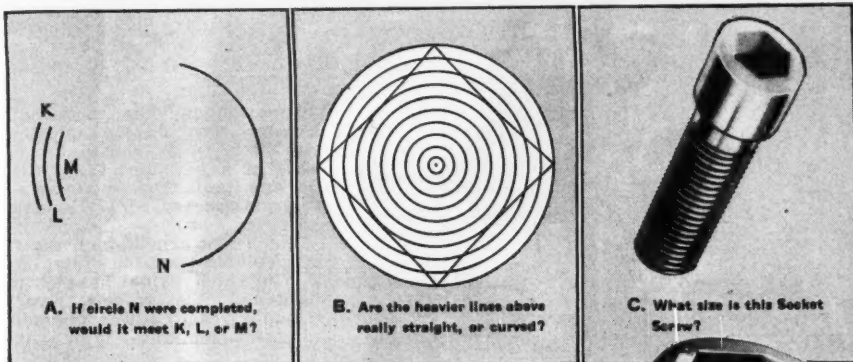
M & N Model M13A Hydraulic Hobbing Press

Clifton, N. J. Designated as the Model M13A, the press includes four columns, an upward-moving platen, and a completely enclosed base containing a hand-operated pump.

Specifications of the machine are as follows: ram diameter, 13 inches; opening between rods, 11 inches left to right and 18 inches front to rear; daylight opening, 12 inches; diameter of columns, 3½ inches; maximum stroke, 4½ inches; height to platen, 42 inches; overall height, 63 inches; floor space, 28 x 28 inches; height of base, 30 inches; and approximate weight 2,300 pounds.

The press can also be obtained in a 400-ton capacity model having the same specifications as given above.

# Can You Always Believe Your Eyes?



Some things aren't always what they seem to be—even to experienced eyes. The size and thread pitch of the socket screw above, for example, were guessed wrong by many of the shop men questioned in a recent test. On the job, that means they must take time out to find out.

## There isn't any question... WHEN IT'S SIZE-MARKED

Any assembly worker can spot the right size without effort—no need to waste time—no need to guess and risk errors. The correct size is clearly marked on the head.

At the tool-crib, left-over, mixed-up screws are quickly sorted and put back in the proper bins, without slow "miking" or gauging.

A valuable sales feature, too. Ask any maintenance man who service your product after it's sold. He'll appreciate P-K Size-Marked Screws because he can easily tell which ones go where when reassembling.

### Plus—GEAR GRIP\*

Gear Grip makes Size-Marked Screws slip-proof, even when fingers are oily. Only Parker-Kalon offers Socket Head Cap Screws with both features. Write for samples, today. Parker-Kalon Corporation, 200 Varick Street, New York 14, New York.

#### ANSWERS

- A. N and M are arcs of the same circle.
- B. The lines are curved.
- C. When it's P-K Size-Marked, there's no question!

U. S. PAT. No. 126,409

SOLD ONLY THROUGH ACCREDITED DISTRIBUTORS

**PARKER-KALON** *Could you forget* **SOCKET SCREWS**

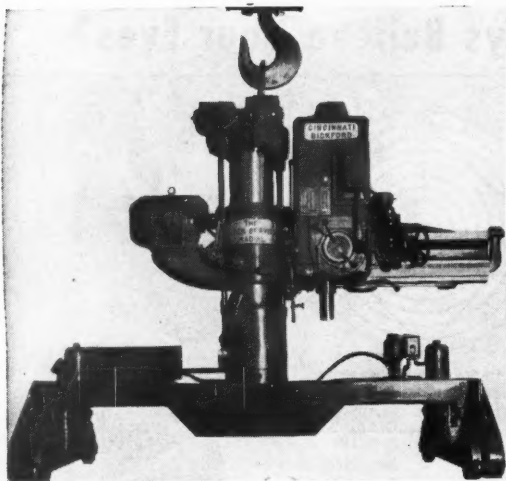


### ANOTHER P-K FIRST GROUND THREAD Socket Set Screws

● Smooth, mirror-bright, clean finished threads—centerless ground on hardened blanks. Accurate contour and lead, dependable Class 3 Fit. Free from imperfections common to ordinary cut thread set screws... a "shining example" of good workmanship. Ask for samples. You'll see the difference.

P-K SOCKET SCREWS  
ARE AVAILABLE FOR  
PROMPT DELIVERY!  
Send for Stock List Now





Cincinnati Super Service Radial  
Drill with Special Base

### Cincinnati Super Service Radial Drill with Special Base

The radial drilling unit shown in the accompanying illustration is now being

introduced by The Cincinnati Bickford Tool Co., Oakley, Cincinnati 9, Ohio. The unit consists of a standard Cincinnati Service Radial Drill mounted on a prefabricated steel Gondola base.

The 4-foot arm 13-inch diameter column portable radial has a 110 $\frac{1}{2}$ -inch wide base with hardened steel wheels, power clamping, and power traverse (24 feet per minute) with push-button control located at the head of the machine. The machine incorporates a shortened column and a large lifting ball attached to a steel cap.

The illustration shows a front view of the machine and base hanging by the ball hook attached to the steel cap on the column, thus demonstrating the ideal balance of the entire unit.

## COMET

### BORING, FACING and INTERNAL THREADING TOOLS

For holes from  $\frac{1}{8}$ " upward, 15 different sizes

**Made of Super-High-Speed Steel  
Specially Heat Treated**

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.

**COMET TOOL CO.**

738 Broadway, New York, N. Y.





**HOW TO UP PRODUCTION**



**BAY  
STATE**

### **MOUNTED WHEELS—POINTS**

The Bay State line contains "points" you cannot afford to overlook. They are made from solid blank forms and are shaped, trued, and sized on special lathes after mounting on steel mandrels. They are thus automatically pretested to make certain that the wheels and points are truly "stuck for life" to the mandrels.

Branch Offices and warehouses  
Detroit — Chicago  
Distributors — All principal cities

*Top Performance Consistently Duplicated*

**BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.**





Ohmstede Circle Cutter in Use

### Ohmstede Circle Cutting Machine

A flame cutting machine with circle cutting range of 0 to 40 inches inclusive is announced by the Ohmstede Machine Works, Beaumont, Tex. According to the manufacturer, the machine requires

no electrical connections but relies on a self-contained unit to furnish the necessary power. A simple hydraulic system is provided for controlling the speed of the machine, which is of portable design and weighs 90 lb. complete with torch.

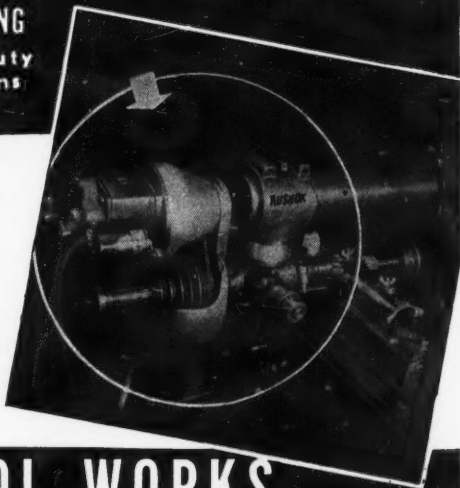
The Ohmstede Circle Cutter consists of a semi-circular base which forms a support for the machine; a main column; and an overhead aluminum arm which houses the power unit and the hydraulic speed control unit. A main drive spindle projects from the aluminum arm, this spindle carrying the torch in a circular path. The torch is adjustable for cutting different diameters and can also be set at any desired angle so as to cut and bevel the circle at the same time.

The self-contained power unit of the Ohmstede Circle Cutter is arranged to move the torch along in its circular path, and the hydraulic unit controls the speed

### MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations

Photo shows a special operation not suited to standard straddle mill set up but easily handled by means of a RUSNOK Milling attachment used horizontally on a standard milling machine, saving one machining operation and accomplishing greater accuracy in finished piece parts. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & 5 taper). Takes 1/16" to 3/4" end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. 1/2 h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty end mill operations. Prompt delivery.

Write for illustrated circular and prices.



**RUSNOK TOOL WORKS**  
4840 WEST NORTH AVE. CHICAGO 39, ILL.



**THE SAME DEPENDABLE PERFORMANCE**



TRADE MARK  
**Starrett**

REG. U. S. PAT. OFF.

**HACKSAWS  
AND  
BAND SAWS**

PRECISION MADE BY THE  
WORLD'S GREATEST MAKERS  
OF PRECISION TOOLS

**STARRETT**

**TO GET THE MOST OUT OF HACKSAWS AND BAND SAWS**

Starrett Hacksaw Booklet "MD" describes the complete line of Starrett Hacksaw Blades for hand frame and hacksaw machine and Starrett Band Saws for cutting

metal, wood and other materials. Starrett Cutting Chart instantly gives complete information for cutting any material by hacksaw or band saw. Write for copies.

*Buy Through Your Distributor*

**THE L. S. STARRETT CO., - ATHOL, - MASSACHUSETTS, - U. S. A.**

*World's Greatest Toolmakers*

**STARRETT**

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK  
HACKSAWS • BAND SAWS FOR CUTTING METAL, WOOD, PLASTICS

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S**



# ILLINOIS COIL SPRING COMPANY

**Offers** especially prompt delivery, especially good value on any type of high grade mechanical spring, sizes .005" to 1/2" diameter wire. Reason:— we have special automatic equipment that enables us to eliminate operations on many spring jobs—cutting costs materially—with faster, more uniform production. May we quote? Call or write . . .

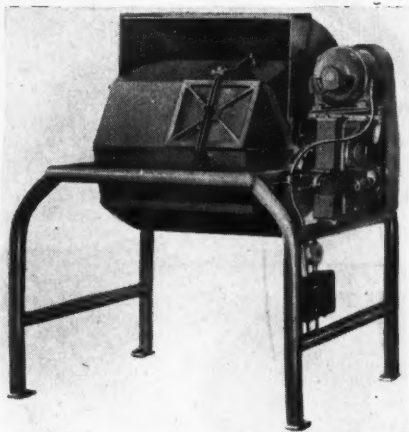
**TELEPHONE BERKshire 6461**

2100 N. MAJOR AVE. CHICAGO 39, ILL.

of the torch, which may be varied by adjusting a control knob conveniently located at the front of the machine. This knob allows for regulation of the amount of oil escaping from a hydraulic cylinder, and, as a result, the machine may be varied from the very slowest of speeds to the highest useful speed.

## Almco Octagonal Deburring and Finishing Barrel

An octagonal deburring and finishing barrel of 30-inch diameter is now being offered by Almco Inc., 231 E. Clark St.,



Almco Octagonal Deburring and Finishing Barrel

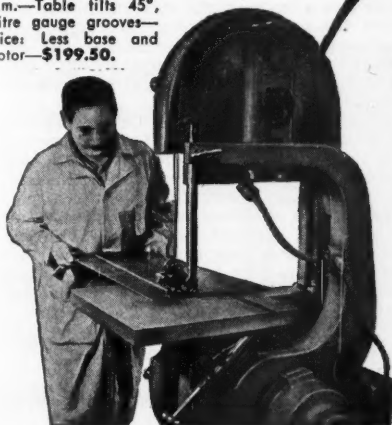
Albert Lea, Minn., in 11 sizes from 32 to 60 inches in length with 9 standard compartment sizes from 12 to 60 inches long. Design features include a four-speed drive, quick-clamp doors, and welded steel construction throughout.

The Almco Deburring and Finishing Barrel can be furnished either plain (unlined) or with full Neoprene lining, and is motor driven at approximately 10, 15, 20, or 30 r.p.m. through a speed reducer and four-step V-belt pulleys, a lever-operated belt release mechanism permitting quick selection of the desired speed. To facilitate positioning of the barrel for loading and unloading, rotation in both directions is controlled by a start-stop lever which applies an hydraulic brake when in the "stop" position.

The compartment doors of the unit are

**16" METAL CUTTING BAND SAW—MBN1105**

Speeds: 70 to 2215 f.  
p.m.—Table tilts 45°,  
mitre gauge grooves—  
Price: Less base and  
motor—\$199.50.



**20" 4-SPINDLE POWER FEED  
DRILL PRESS—D1104F**

Spindle travel 6"—Speeds: 260 to  
2600 r.p.m. with standard motors;  
85 r.p.m. with special gear reduced  
motor—Price: Less motors—  
\$1314.00



## "Paid in Full"

Each of the Walker-Turner Machines shown on this page has long since "paid in full" its low initial cost in savings due to its increased production over the heavier and less flexible tools which they replaced.

In fact, the investment is so low that it is profitable to employ them as part time workers on jobs that were not completely mechanized before.

Used by the thousands on 24-hour day schedules for volume production during the past ten years, they are now being purchased to tool up for low costs in the competitive markets to come.

Plan your operations to speed up production in many directions with Walker-Turner Machine Tools—and use the guidance of your nearest Walker-Turner Distributor.

\*F.O.B. Plainfield—slightly higher west of the Rockies and in Canada  
SOLD ONLY BY AUTHORIZED INDUSTRIAL MACHINERY DISTRIBUTORS

44

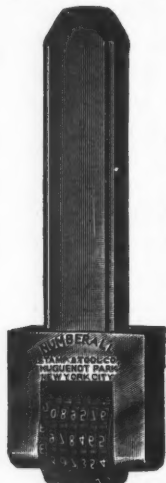


# MACHINE TOOLS

DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS  
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES  
RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS



## Multi - Wheel Numbering Machine Model 70



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly... neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Model No. 70

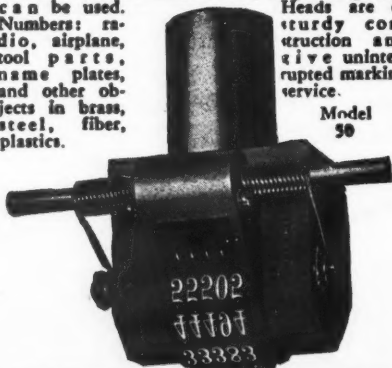
*Write for  
Bulletin MS-70.*

### AUTOMATIC INDENTING NUMBERING HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering. 1/32" up to 3/4" high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics.

Heads are of sturdy construction and give uninterrupted marking service.

Model  
50



**NUMBERALL STAMP & TOOL CO.**  
HUGUENOT PARK STATEN ISLAND 12, N. Y.

light in weight (21¼ lb. each for a 16-inch compartment) and are opened and closed by means of quick-acting toggle clamps. The clamping levers permit the doors to be cracked open for draining the compartments before unloading. Each door has a water-tight sponge rubber seal with take-up adjustment to compensate for eventual compression of the seal. For rapid and complete unloading, door openings extend within ¼ inch of the compartment end walls.

The Almco Octagonal Deburring and Finishing Barrel is mounted in a welded tubular steel frame which permits ready access to the doors for loading the unit. To permit unloading directly into a work pan or into a screen, a 28-inch clearance is provided beneath the barrel. The barrel itself has an approved guard rail and pull-down safety hood, and the driving mechanism is fully enclosed to meet all safety requirements.

## Davis & Thompson 2 WI Two-Way Boring Machine

Designed to allow for the boring of large holes to accurate dimensions at a high production rate, the Davis & Thompson 2 WI Two-Way Boring Machine illustrated herewith has been brought out by the Davis & Thompson Co., 6411 W. Burnham St., Milwaukee 14, Wis. The machine is constructed to bore a 14¼-inch diameter hole 12 inches deep from one side and a 9-inch diameter hole 12 inches deep from the opposite side. The workpieces on which these operations are performed are air cylinders for railroad locomotives. The rate of production is two parts or 8 bores per hour.

The machine is equipped with an indexing table on which a work-holding fixture is mounted. When boring is performed from opposite sides and work is complete, all bores are said to be in absolute alignment. The cycle of operation provides for rapid traverse of each head to the work. A telescoping gage is used to predetermine the length of bore. This reading is transferred to gages and limit switches to ensure proper depth of feed. The machine is placed in operation by depressing the traverse button and advancing the tool to start of cut. When the button is released, the machine goes into feed. On completion of the cut, a limit switch reverses the feed and returns the head to starting position. This sequence is carried out on both heads.

A lever on the indexing table actually raises the table 0.010 inch off the ways, thereby transferring the weight of the

# THE DRILL WITH A HUNDRED AND ONE SPEEDS

4 SPINDLE M96  
RIGHT HAND  
SPINDLE  
POWER FEED

**ALL SPEEDS  
INSTANTLY  
AVAILABLE**

WHILE MACHINE  
IS RUNNING

**TWO MODELS**

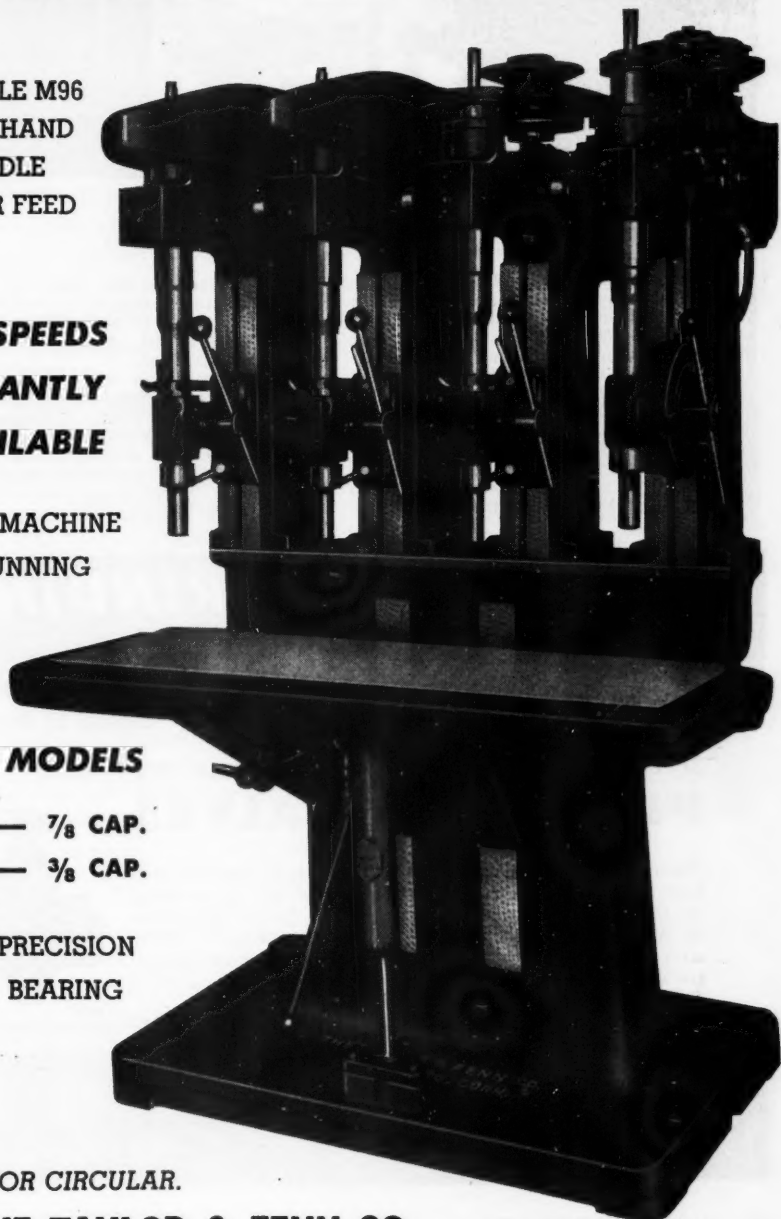
M96 —  $\frac{7}{8}$  CAP.

M125 —  $\frac{3}{8}$  CAP.

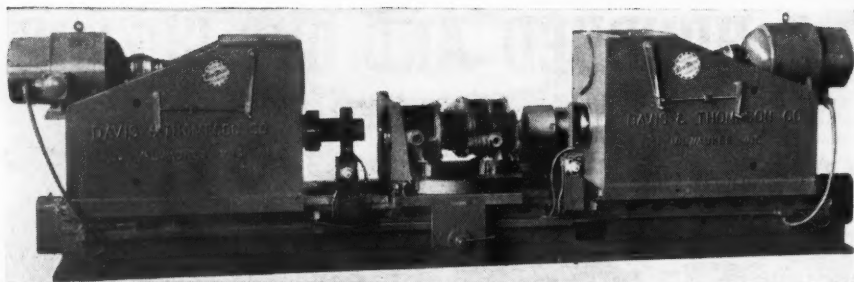
BOTH PRECISION  
BALL BEARING

SEND FOR CIRCULAR.

**THE TAYLOR & FENN CO.** HARTFORD 1, CONN.







Davis & Thompson 2 WI Two-Way Boring Machine

table to ball bearings and making index movement easy. The indexing pin is manually withdrawn and the table manually indexed 180 deg. The lever is then reversed, locking the table in position.

An individual drive provided for each head consists of a 15 h.p. variable speed d.c. motor, a set of V-belts, a set of change gears, and a gear train. A speed range of 330 to 1,000 r.p.m. is obtained by varying the motor speed and driving directly through the V-belts to the spindle. Disengaging the clutch disengages the

motor-driven sheave, and the drive is then effected through the change gears and gear train to the spindle. A speed range of 60 to 300 r.p.m. is obtained with this arrangement.

Safety features are incorporated in each head to prevent the clutch from being engaged without disengaging the train of gears. Feed and rapid traverse are provided by screw drives, individually powered by hydraulic motors. Two individual hydraulic pumps are used for power feed.

## LAPPING and GRINDING COMPOUNDS

GRADE 17 (Medium) GRADE 18 (Medium Fine) GRADE 19 (Fine)

SPECIAL COMPOUNDS FOR BRASS AND BRONZE

### PLUG COCK VALVES

These three grades of compounds have a special water soluble base that possesses excellent lubricating qualities for grinding various styles of plug and key cock valves. These compounds do not "niggard or score" while grinding—a common trouble with most compounds. They contain abrasives of the proper grit size for grinding or lapping-in brass and bronze plug valves. The finished parts can be washed with ordinary water.

Generous samples sent upon request



Photo courtesy Hays Mfg. Co.

# UNITED STATES PRODUCTS CO.

518 MELWOOD ST.

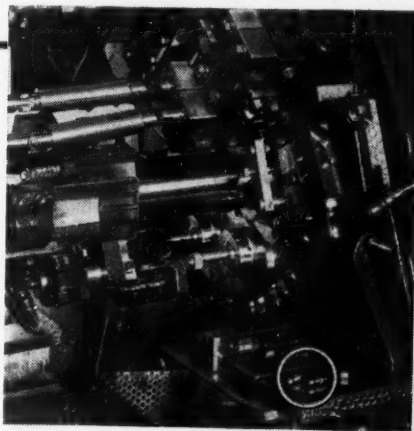
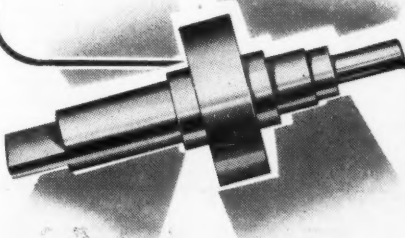
PITTSBURGH, PA.



# 8 operations in 4 seconds

The part is a brass pinion blank, one inch long,  $\frac{3}{8}$ " diameter.

The eight operations include shaving six diameters for fine concentricity, and milling flats on large end. The entire job is completely finished in 4 seconds machine time—900 finished parts per hour. This is *fast* production time.



National Acme offers you something more than a series of production machines.

Improved methods of tooling and handling parts are important factors by which Acme-Gridley 4, 6 and 8 spindle automatics are making new cost-reduction records in hundreds of mass production shops.

This they accomplish by reducing machine time—a vital consideration when

both raw material costs and hourly wage rates are at high levels.

Write us about possible time-saving improvements in your own shop.

## The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics:  
1-4-6 and 8 Spindle • Hydraulic Thread  
Rolling Machines • Automatic Threading Dies  
and Taps • The Chronolog • Limit Motor Starter  
and Control Station Switches • Solenoids  
Costrilugas • Contract Manufacturing



Brown & Sharpe Improved No. 5  
Plain Grinding Machine

### Brown & Sharpe Improved No. 5 Plain Grinding Machine

To afford maximum protection with accessibility, the electrical controls on the

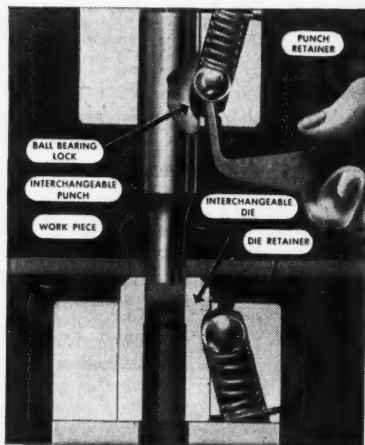
Brown & Sharpe No. 5 Plain Grinding Machine are now fully enclosed in a compartment on the right side of the machine, according to the Brown & Sharpe Mfg. Co., Providence 1, R. I. While the headstock, table, grinding wheel, and coolant pump are driven by separate motors, one dust and moisture-proof main push-button switch conveniently located on the control compartment at the right front of the machine governs the starting and stopping of the whole machine.

The magnetic controls, individual motor overload relays, transformer for control system, and main line disconnect switch are all mounted in the compartment on the right side of the machine. When the lever on the compartment door is turned to allow the door to open, a safety device operates the main line dis-

## PUNCHES and DIES are *Quickly* INTERCHANGEABLE

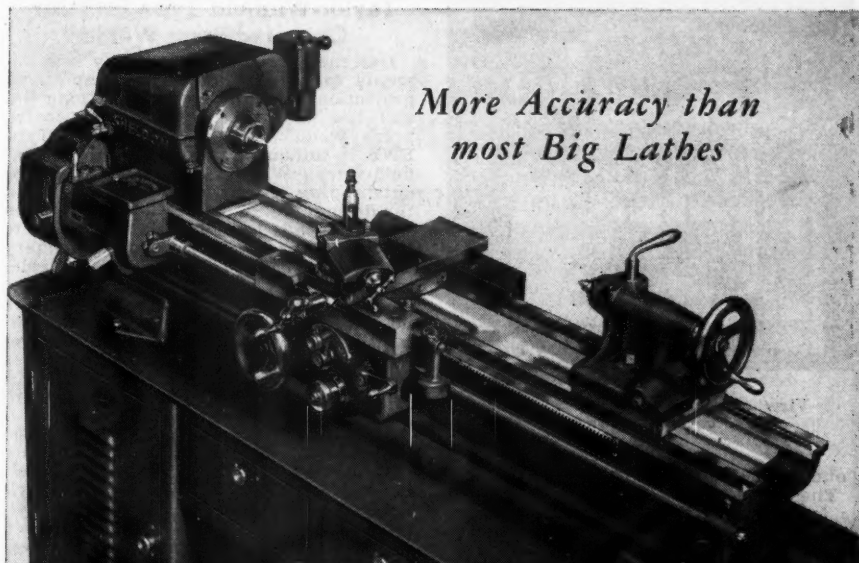
Allied's R-B Interchangeable Punches and Dies are quickly installed for trouble-free production in the metal-working and plastics industries. They are available from stock in *standard* round, oblong and square shapes of almost any required size. Specials of any size, shape or material are promptly furnished to your specifications—and delivery dates are *dependable*.

Write today for large illustrated R-B Catalog.



## ALLIED PRODUCTS CORPORATION

Department 21 • 4624 Lawton Ave., Detroit 8, Michigan



*More Accuracy than  
most Big Lathes*

## SHELDON

*New TRB-S56*

### Precision Lathes

There is a degree of accuracy built into the new \$1000.00 Sheldon TRB-S56 Precision Lathe heretofore found only in a few of even the most costly lathes. For example, spindle bearings are "Zero Precision" — the very finest, closest tolerance tapered roller bearing manufactured. The heavily struted, 1-piece bed has 2 V-ways and 2 flat ways ground on special bed grinder and held to the closest tolerance of lateral and parallel alignment. The lead screws are milled on the most accurate special lead-screw milling machine.

In the Sheldon TRB-S56 modern engineering, extensive tooling combined with the finest special machinery — a modern

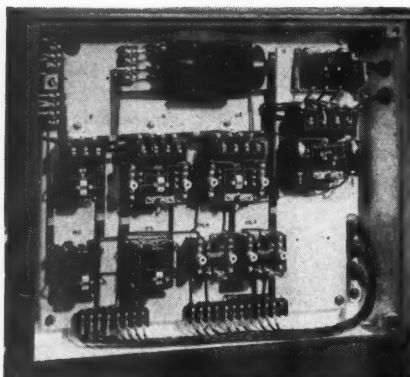
machine tool plant with modern equipment, modern manufacturing methods—give this small ( $11\frac{1}{4}''$  swing, 1" collet capacity, 56" bed, 8 speed—50 to 1350 r.p.m.), convenient, moderate priced lathe, the permanent accuracy and features, heretofore found only in more cumbersome and costly lathes.

*Write for circular*



## SHELDON MACHINE CO. Inc.

*Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers*  
4250 N. KNOX AVENUE • CHICAGO 31, ILLINOIS, U. S. A.



View of control compartment with cover removed

connect switch and shuts off the current.

The cover of the control compartment is felt gasketed and designed to ensure that any solids or liquids falling on top of the enclosure will be deflected from the cover gasket. The electrical equipment is applied to the machine in full accordance with the practices outlined in the Machine Tool Electrical Standards.

## Taylor-Winfield Type ENB Air-Operated Press Welder

Designed to meet present-day requirements for rugged but precise spot and projection welding service with long life and low maintenance, an air-operated press welder designated as the Type ENB is announced by The Taylor-Winfield Corp., Warren, Ohio. A number of outstanding features are incorporated in the design, including a roller anti-friction welding head; tap switches connected to the transformer without flexing primary leads; provision for the use of side-mounted electrical controls; composite copper-steel knee construction to ensure maximum rigidity when projection welding; transformer design of "damage-resisting" construction; and air valves mounted adjacent to air cylinders, thus providing for low air consumption with high operating speeds.

The welder can also be constructed with certain optional features, such as a bellows air lock mechanism with low voltage firing switch; adjustable stroke cylinder; adjustable-retractable stroke cylinder with either hand valve or solenoid valve and foot switch operation; series-parallel tap switch; and various types of horns, electrode holders, and dies for spot and projection welding.

The Taylor-Winfield Type ENB Air-



**A VISE AT A PRICE  
ONLY \$39.50  
COMPLETE WITH VISE,  
WORK TABLE AND WRENCHES**

A honey of a multi-angle vise and a handy work table, too. Real convenience for all types of work at a price so small no shop can afford to be without one.

**FROM DEALER OR WRITE FOR LITERATURE**

**MANUFACTURERS ENGINEERING SERVICE, INC.**  
415-16 SECURITY BANK BUILDING • TOLEDO, OHIO

## ... A "REVOLUTION" IN MACHINING INDUSTRY ...

**TOUGH Threading jobs licked by  
COULTER TYPE "H"  
THREAD TAP MILLING MACHINE**

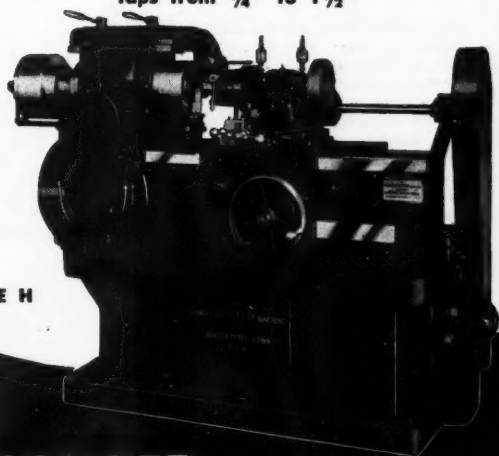
NOW ... comes a development that extends the capacity of this 'wonder' machine. **COULTERS** are made to perform the most delicate threading operation with both speed and accuracy . . . 40 years of specialized experience, manufacturing precision machines exclusively. The **NEW Type "H"** is equipped with an *overarm tail center* and *large collet chuck*, holding the work rigidly so **ONLY ONE REVOLUTION OF THE TAP** is necessary.

Any number of **FLUTES**, eccentric or con-eccentric relief straight or taper can be produced. Pipe taps from  $\frac{1}{8}$ " to  $1\frac{1}{2}$ " and straight taps from  $\frac{1}{4}$ " to  $1\frac{1}{2}$ "

WRITE FOR  
FULL PARTICULARS

PRODUCTION MACHINES  
SINCE 1896

TYPE H



*The James* **COULTER** *Machine Co.*  
BRIDGEPORT • CONNECTICUT • U. S. A.

*Attach this*  
**FLEXIBLE TOOL-SHAFT**  
 to any available  
 motor

for **EASY**



- GRINDING
- BUFFING
- DRILLING
- POLISHING
- SANDING

The STOW Flexible Tool-Shaft, in combination with the proper attachments, will perform all the operations so important to shop mechanics and maintenance men, plus many miscellaneous jobs. It expands the applications of power hand-tools also . . . quickly, easily, and economically.

Every shop should have at least one of these STOW Flexible Tool-Shafts. Its ample length and portability makes it ideal for reaching those out-of-the-way, hard-to-get-at places, and it is simple to connect and disconnect.

Adaptable to portable power units, either electric or gasoline, and to stationary power plants. Write for full details today, or see your mill supplies or hardware dealer!

**\$15**

Here's Real Value For  
 (5 Ft. Model)

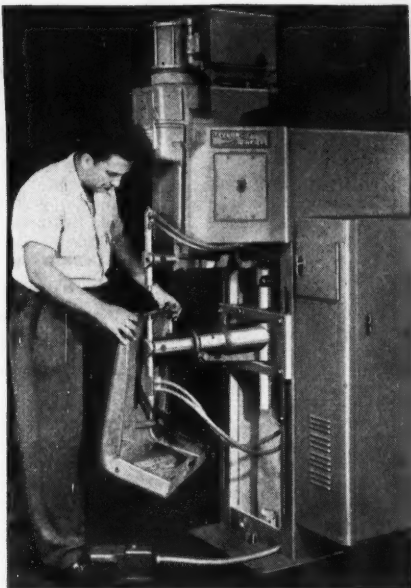
A Price All Can Afford! **6 FT. MODEL \$16.50**  
*Slightly more West of Rockies*

**STOW**

**MANUFACTURING CO.**

1 Shear St., Binghamton, N. Y.

Operated Press Welder is available in two styles. The Style 1 can be utilized either as a projection welder or a combi-



Taylor-Winfield Type ENB Style 4 Spot Welder with Side-Mounted Controls

nation projection and spot welder when horns are used. The Style 4 is a spot welder with a swiveling lower horn.

### Sundstrand Model 16 Automatic Lathe

An automatic lathe with 75 h.p. spindle drive motor, designated as the Model 16, is announced by the Sundstrand Machine Tool Co., Rockford, Ill. The machine has a 17-inch swing over slides and is designed to swing a 21-inch diameter chuck. It can be furnished in three bed lengths of 36, 60, and 84 inches between centers.

The quick-cycle change-over feature of the lathe enables it to be multiple tooled for short runs as well as for production turning. The machine can be used for either shaft turning jobs or chucking work, and is said to have ample horsepower to allow for the efficient use of multiple tooling and carbide cutting tools.

Both the spindle and front carriage



# LOOK

## at the DIAMOND

### *Examine it Carefully*



Diamond tipped cutting tools may be poor, good or excellent — depending entirely on the quality of the diamond used. And usually the price determines what the quality is.

In the above cut-away photo, the correct shape of the diamond is shown. It is set in the Meinhardt Thermal Process (low temperature) setting.

To get extra quality diamonds, set in this improved process, always specify

## *Meinhardt*

when you order diamond tipped tools. You can buy cheaper tools, but you can't get better.

If you haven't our complete catalog that lists tools by uses, write for it today.

We also offer a full line of diamond grinding and finishing wheels. Write for Catalog 147.



# MEINHARDT

## Diamond Tool Co.

2810 MILWAUKEE AVENUE, CHICAGO 18, ILLINOIS



**Sundstrand Model 16  
Automatic Lathe Set  
Up for Turning Large  
Shafts**

Complete control of all cycles is provided by the adjustment of dogs on a cycle control disc. By changing the position of the dogs on the disc, the lengths of rapid approach, feed, and rapid return strokes are changed. In this manner, cycle set-up and change-over

drive units are provided with two different driving gear centers. In each case, this feature provides for an increased range between high and low spindle speeds and high and low front carriage feeds. In addition, the number of gears and feeds obtained from one set of gears are both doubled.

from one turning job to another are simplified.

Pendant control is provided for ease of operation in the turning of large work. The entire machine cycle is controlled through push buttons. A power-operated tailstock is provided for speed and convenience in loading heavy workpieces.

## **WHITNEY-JENSEN PRODUCTS**

30 YEARS EXPERIENCE

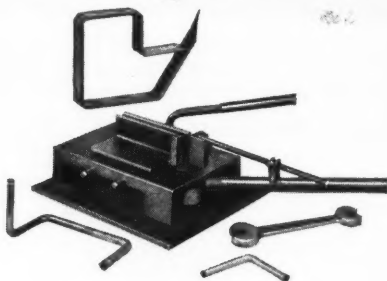
### **No. 52 BENDER**

CAPACITY, MILD STEEL

$\frac{1}{2}$ " ROUND SOLID BAR

$\frac{1}{4}$ " x 2" FLAT BARS

$\frac{1}{4}$ " x 2" NOTCHED ANGLE IRON



Bender is easy to operate and ruggedly built. Patented adjustment automatically compensates for the thickness of metal.

### **No. 50 ANGLE IRON MITRE NOTCHER**

CAPACITY—ALL SIZES OF ANGLE IRON THRU 2" x 2" x  $\frac{1}{4}$ "  
WEIGHT—62 LBS.



**WHITNEY METAL TOOL COMPANY**  
110 FORBES ST. • ROCKFORD, ILL.

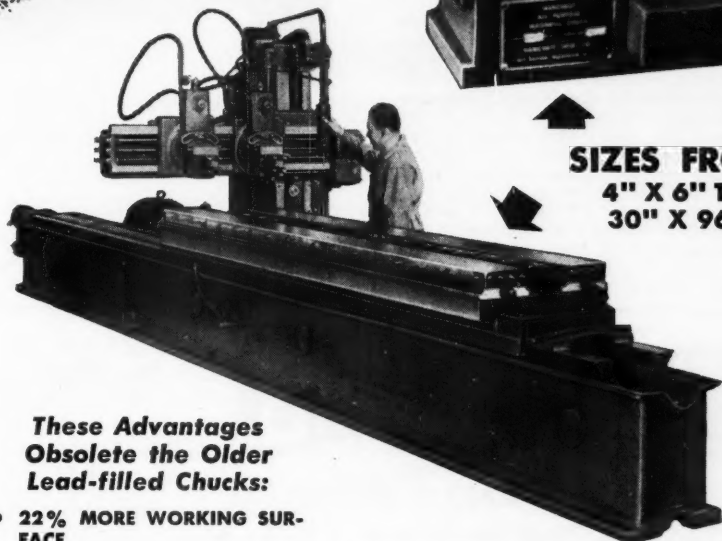
**NOW- For Quick Deliveries**

**HANCHETT Laminated\* Top  
Electro-Magnetic  
CHUCKS**

\* PATENT PENDING



**SIZES FROM  
4" X 6" TO  
30" X 96"**



**These Advantages  
Obsolete the Older  
Lead-filled Chucks:**

- 22% MORE WORKING SURFACE
- MAGNETIC RIGHT TO THE EDGES
- MORE UNIFORM HOLDING POWER
- HOLDS SMALLEST PART FIRMLY
- ALL STEEL TOP PLATE
- HERMETI-COIL, WATERPROOF CONSTRUCTION

Write us today and get full details on the exclusive laminated top (patent pending) chucks in any rectangular size. You can be sure of quality and performance for all Hanchett chucks are backed by over 50 years of grinding engineering experience. That's why more and more shops are demanding Hanchett laminated top chucks. Ask for complete bulletin 045-MC.



**HANCHETT MFG. CO.**

**Magnetic Chuck Division**

**BIG RAPIDS**

**MICHIGAN**

Automatic declutching between the spindle and spindle motor, together with a self-adjusting magnetic brake for quick stopping of spindle rotation, is provided.

The rear carriage of the lathe is adjustable the full length between the headstock and tailstock centers. Screw feed is provided to the front carriage, and the rear carriage and tailstock are provided with rack and pinion adjustment.

### Cerweco Hand-Operated Apron Leaf Type Bending Brake

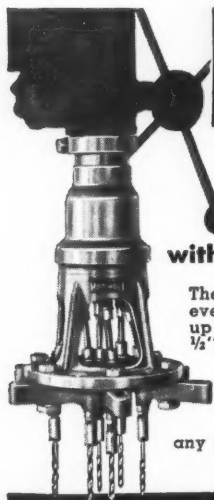
A hand-operated apron leaf type brake which is said to be ideal for sheet metal shop and short-run production jobs is now being produced under the trade name of Cerweco by the Wm. C. Johnson & Sons Machinery Co., 1234 N. 12th Blvd., St. Louis 6, Mo. Easy and simple to set up and operate, the machine is of heavy steel plate welded construction with ample bracing and trussing, and is available in four sizes of 4 feet for 12 gauge sheet metal, 6 and 8 feet for 14 gauge sheet metal, and 10 feet for 16 gauge sheet metal.

Features of the Cerweco Hand-Oper-



Cerweco Hand-Operated Apron Leaf Type Bending Brake

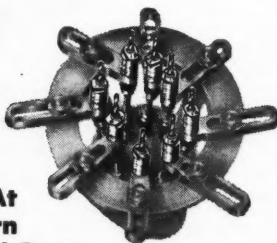
ated Apron Leaf Type Bending Brake include quick, independent clamping of sheets; quick set screw adjustment for upper clamping plate; and renewable bending edge bars.



Pats. Pending

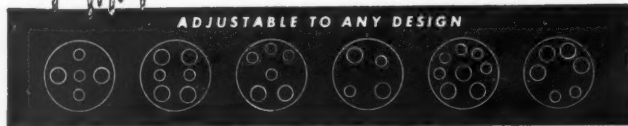
### 6 AND 8 SPINDLES!

**Drill Up To 6 or 8 Holes At One Stroke In Any Pattern with Multi-Drill Fits Any Drill Press**



The 8-spindle unit in the MULTI-DRILL line brings your single spindle tools even greater production capacity and wider operating range. You can drill up to 8 holes at one stroke in any hole pattern on or within a 9" circle . . .  $\frac{1}{2}$ " center distances . . . drill sizes 1-32" to  $\frac{3}{8}$ " (Special adaptations available.) All the features which make MULTI-DRILLS preferred tools are built in . . . fact, easy positioning of locating arms . . . heavy duty, long-life block-type universal joints . . . "Oillite" lifetime bearings . . . precision collet spindle assemblies and rugged construction throughout assure long trouble-free service. The 6-Spindle MULTI-DRILL handles any hole pattern on or within 5" circles— $\frac{1}{2}$ " min. centers.

Write for Catalog Sheets and Complete Details



### COMMANDER MFG. CO.

4224 W. Kinzie Street  
Chicago 24, Ill.  
Phone SACramento 4545

New...



**HARD-CASE  
BLUE-TEMPER  
TREATMENT**

**Prolongs Cutting Life of  
RELTOOL "SHOCKLESS" Center Drills**

The exclusive "SHOCKLESS" design which reduces tip breakage is augmented by an additional, special heat treatment which produces a superficial "HARD-CASE" .0002 to .0005 deep, and which "Rockwells" 68 to 78 "C" scale. A follow-up "BLUE-TEMPER" Treatment removes any interior strains, leaves the tool with a distinctive blue finish, prolongs the life of the cutting edges from 25 to 300%.

**New, WIDE OPEN FLUTES** on all Reltool  
"SHOCKLESS" and "Standard" Center  
Drills provide for Fast, Positive  
Chip Clearance.



**END MILLS  
by RELTOOL**

**In a Full Range of Styles and Sizes**

They "round out" the Reltool line of dependable metal cutting tools. Precision made of finest, high-speed tool steel, they are scientifically heat treated and case hardened for long life. Retool with RELTOOL! Write for bulletins on the Complete Reltool Line of Circular Saws and other Metal Cutting Tools.

 **Reltool CORPORATION**  
**RELIABLE METAL CUTTING TOOLS**

710 WEST MICHIGAN STREET

MILWAUKEE 3, WISCONSIN

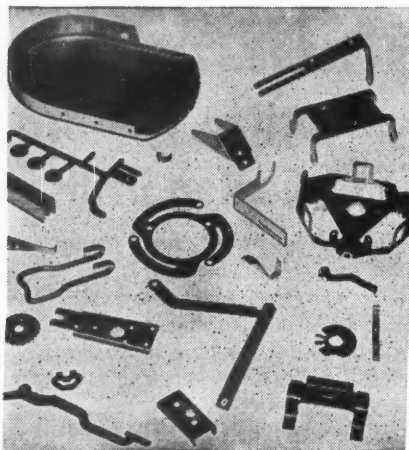
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April, 1947

MODERN MACHINE SHOP 263

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### **Our Specialty:**

Short run stampings, one piece to 30,000: for small production runs—for experimental model work.

Small, irregular shaped parts stamped, formed, pierced, extruded or tapped to your specifications.

We use quick-process temporary or semi-permanent dies.

Send us your prints for firm quotations and delivery commitments.

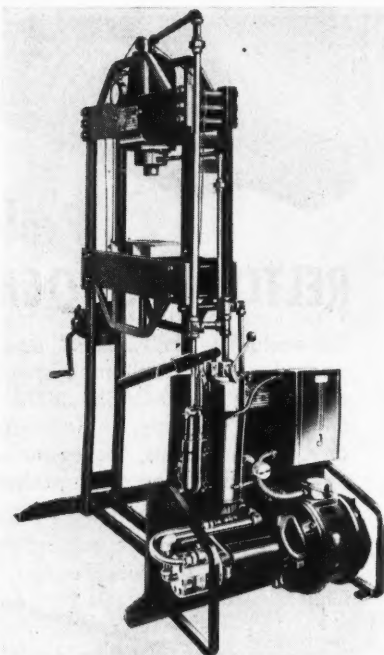
**WLS STAMPING  
COMPANY**

*Short Run Stampings*

**3296 East 80th Street  
Cleveland 4, Ohio**

## KRW Motor-Driven Hydraulic Arbor Press

A motor-driven hydraulic arbor press in 25, 50, 60, and 75-ton capacities has been announced by K. R. Wilson, Buf-



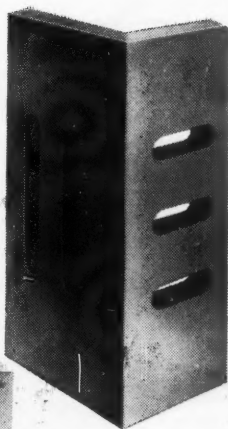
KRW Motor-Driven Hydraulic Arbor Press

falo, N. Y. The press is designed especially for short runs or small work.

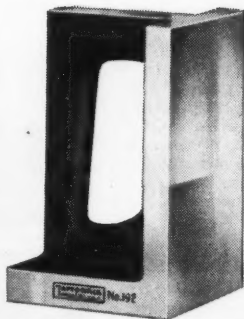
The construction of the press is extremely rugged, the frame being made of hot rolled steel. The bed plates are trussed for added strength, with all joints electrically welded. The bed can be easily raised or lowered by means of a cable drum and crank. Since the frame is a weldment, most press dimensions may be changed to meet any particular problem at slight extra expense.

The operation of the ram is controlled by a conveniently located motor valve control which can be actuated by a flip of the finger and thumb. The motor-driven hydraulic pump used is a Seco radial type ranging in capacity from 3,000 to 10,000 p.s.i., and is said to be practic-

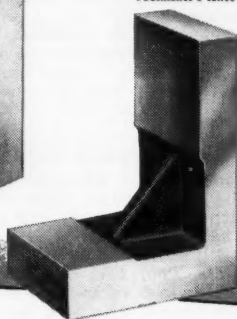




Style 9185  
Slotted Angle  
Irons



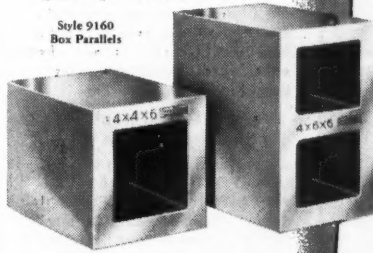
Style 9191  
Universal Right  
Angle Irons



Style 9180  
Toolmaker's Knee



Style 9201  
Measuring Irons



Style 9160  
Box Parallels

*Speed*

**YOUR SET-UPS and LAYOUTS—  
Simplify Inspection Procedures**

with these

## **TAFT-PEIRCE SPECIALTIES**

Shop foremen and chief inspectors appreciate the convenience of Taft-Peirce Tool-Room Specialties in maintaining top standards of precision on large-volume production.

Small shops and laboratories find that these tools stretch the field of usefulness of limited machine equipment, by permitting a wider variety of set-up. And regardless of the type of job, its accuracy will be safeguarded by the standards of quality and workmanship which are characteristics of every Taft-Peirce product.

These and many other highly useful tools are shown in the new Taft-Peirce Handbook. Write for your copy today to The Taft-Peirce Mfg. Co., Woonsocket, R. I.

IN TOOLING, SET-UP AND INSPECTION . . .

## **T-P means TOP PRECISION**

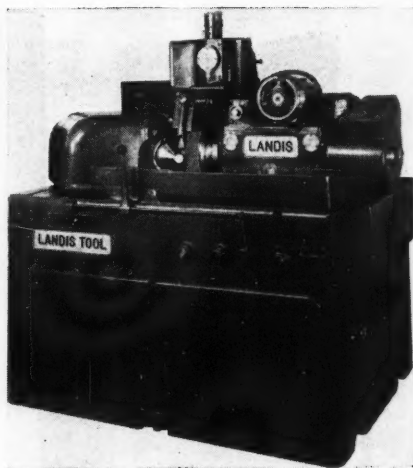
ally foolproof in operation under normal conditions and maintenance.

The press is equipped with the exclusive KRW pressure by-pass valve, thus permitting the required tonnage pressure to be accurately set and then maintained in successive operations. Another KRW feature is the spring actuated, quick ram return which is arranged to return the ram to the "open" position instantly when the control lever is released.

### Landis Tool Type H Valve Grinder

Automotive and airplane valves are said to be ground to an exact seating surface with low operator fatigue factor using the Landis Tool Type H Valve Grinder illustrated herewith, product of the Landis Tool Co., Waynesboro, Pa. The machine is designed to handle valves with face angles 0 to 62½ deg. and face diameters of ⅞ to 3½ inches.

The Microsphere bearing headstock of the machine utilizes collets or V-blocks for chucking and is arranged to clamp hydraulically. Loading and unloading may be performed with the headstock spindle rotating or it may be cycled to stop when grinding is completed. The headstock is mounted on a fixed table



Landis Tool Type H Valve Grinder

which provides support for the full swiveling range.

The wheel spindle of the unit is also

## For PRECISION Built

*Specify*

COMPACT DESIGN

HIGH TORQUE

HIGH-RATIO LEVERS

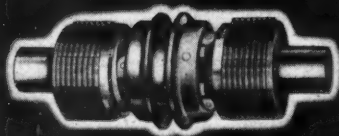
POSITIVE NEUTRAL

PRECISION BUILT

LONG WEAR LIFE

EASY ADJUSTMENT

**ROCKFORD**  
PULLMORE



MULTIPLE-DISC  
**CLUTCHES**

Precision machining and grinding, proper hardening and the symmetrical contours of PULLMORE Multiple Disc CLUTCHES insure perfect balance and smooth operation at both high and low speeds. Because of this close-tolerance construction and compact design the powerful pull of PULLMORE CLUTCHES is not affected either by centrifugal force or the direction of rotation.

**Send for This Handy Bulletin**

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



**ROCKFORD CLUTCH DIVISION**

BORG-  
WARNER

300 Catherine Street, Rockford, Illinois, U. S. A.

*chucks*  
**IN UNION THERE  
IS STRENGTH**



## ... Accuracy and Adaptability, too

Exclusive Visible Index, forged steel bodies, working parts of special alloy steel heat treated and finish-ground to maximum accuracy, design and fabrication based on Union's 71 years experience making the broadest line of chucks in the world...

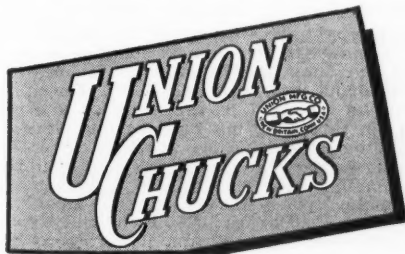
These are the reasons Union Geared Scroll Combination Chucks are increasingly specified to meet industry's most exacting chucking requirements.

The Exclusive Visible Index ends guess-

work and time-wasting tests in tuning up jaws from eccentric to concentric action and permanently safeguards accuracy. Self-centering and independent jaw action gives two chucks in one. Reversible jaws double the possibilities for profitable use. Standard sizes from 4 to 24 inches; larger on special order.

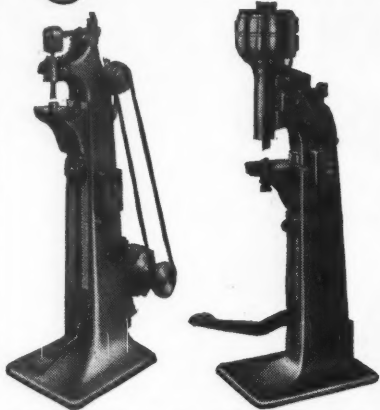
For complete specifications on these and the other chucks that compose the broadest line of chucks in the world, write for Catalog No. 62. Our engineers will be glad to help you with your chucking problems.

**Chucks - Hoists - Trolleys**



**UNION  
MANUFACTURING CO.**

306 Church Street, New Britain, Conn., U.S.A.

**GRANT****RIVETERS**

• Pioneers in the riveting field. Head rivets from smallest to  $\frac{3}{4}$ " diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport 5, Conn.

**MILWAUKEE  
SURFACE PLATES**

36" x 48" . . . semi-steel . . . accurately machined. Securely mounted cast legs are machined and provided with adjusting screws for perfect alignment. Shipping weight, 1300 lbs. Also larger or smaller plates with planed or scraped surface. We also manufacture angles and parallels as shown underneath surface plate.  
Write for details.

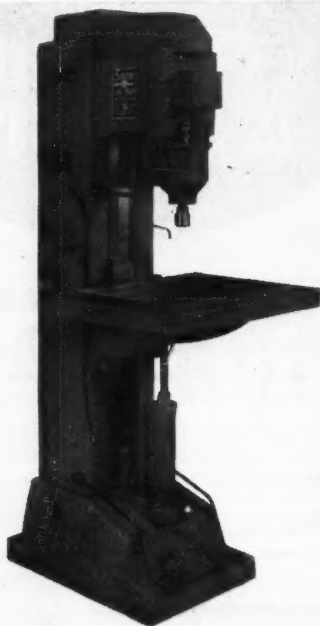
**J. C. BUSCH CO.**

Engineers and Machinists Since 1907  
26 E. PITTSBURGH AVE. MILWAUKEE 4, WIS.

mounted in Microsphere bearings and has a reciprocating movement which is adjustable from 0 to  $\frac{5}{8}$  inch. The machine has a standard wheel size of 20 x 1 x 8 inches and a wheel drive motor of 3 h.p. The hydraulic oil reservoir contains 32 gallons and the coolant reservoir, 42 gallons. The machine weighs 8,700 pounds.

**Snow Air Tool**

A basic machine tool of air-operated electrically-controlled design adaptable for use in performing drilling, threading,



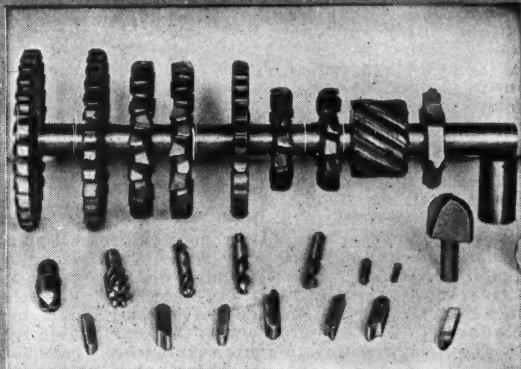
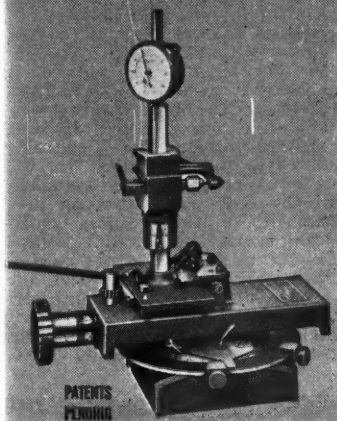
Snow Type 4-UT Universal Tapping Machine

and tapping operations, to be known as the Snow Air Tool, is now being produced by the Snow Manufacturing Co., 615 S. California Ave., Chicago 12, Ill. The unit can be obtained in the form of a drill press, threading machine, and universal tapping machine, the function of each being initiated at the touch of a button.

The drill press is available in two sizes; namely, Type 1-UD with a rated capacity in mild steel of up to  $\frac{1}{4}$  inch, and Type 2-UD with a rated capacity of  $\frac{1}{8}$  to  $\frac{3}{8}$

# Don't Say Form Grind it ... Say *Radiform* it

TRADE MARK REG.



*Here are a few standard cutting tools that have been ground on the radiform into special forms.*

The Radiform method of generating form tool makes hand grinding to template obsolete. The trial and error method is now converted to an exact science.

Radiform will save you time, money, and give you precision results you had never hoped for. The Radiform will simplify your difficult tool grinding jobs.

Carbide tools are no longer difficult to grind with a diamond wheel. Put this new Radiform to work in your machine shop today.

New reduced prices have just been released, wire or write today for descriptive literature and new price lists.

A number of good territories are open to qualified distributors.

**W. F. MEYERS COMPANY • ESTABLISHED 1888**  
1014 FOURTEENTH STREET • • • BEDFORD, INDIANA

inch. The design of the machine provides for infinite feed, split-second drill control, automatic withdrawal of the drill, and the elimination of drill breakage, it is claimed.

The threading machine is available in two sizes which are constructed to thread true to lead and thread form, afford a fine finish, and assure long chaser life at high threading speeds.

The universal tapping machine is supplied in four types; namely, Type 1-UT with a rated capacity in mild steel of No. 2 to 10 or  $\frac{1}{8}$  inch, Type 2-UT with a capacity of No. 6 to  $\frac{1}{8}$  inch N.F., Type 3-UT with a capacity of No. 10 to  $\frac{1}{4}$  inch N.F., and Type 4-UT with a capacity of  $\frac{1}{4}$  to  $\frac{1}{2}$  inch N.F. According to the manufacturer, the machine enables precision tapping for any class fit to be easily performed, with the correct pressure for every size tap and every pitch instantly available.

Construction features of the Snow Air Tool include an air-operated table raising and lowering unit, wide bale-type foot lever, and cast aluminum air head with rust-resistant bronze cylinder walls and graphite carbon pistons. The highly sensitive controls of the unit are enclosed in a rigid welded column and are accessible through a full length door at the rear of the machine. Micro-switch actuated

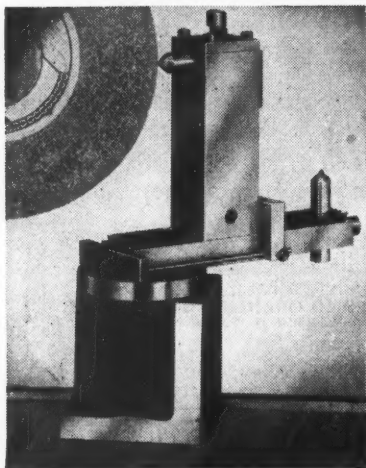
solenoid valves provide for an automatic or controlled operating cycle, synchronizing the head with automatic, semi-automatic, or manually-operated holding fixtures.

### LeMaire 3-Way Cylinder Block Tapping Machine

A three-way tapping machine for tapping holes in the top and both sides of cylinder blocks has been brought out by the LeMaire Tool & Manufacturing Co., Dearborn, Mich. The machine consists of a rigidly fabricated one-piece base with a standard LeMaire No. 150 lead screw tapping unit and a No. 200 tapping unit mounted horizontally at the left and right ends respectively, and a No. 200 unit mounted vertically on a standard column at the rear. Each tapping unit is equipped with multiple spindle heads.

For holding work, the machine is provided with a tunnel type fixture having wear strips, crank bore guide, and adjustable stops for manually loading the part to the primary position. Hand-operated retractable pins provide for final location of the part after engaging locat-

## PRECISION DRESSING AT LOW COST with the "FORM-MASTER" ANGLE & RADIUS DRESSER



- A sturdy, quality instrument. Designed by form-grinding specialists for accurate dressing of both angle and radii at low cost. Easily set with micrometer for radii—and with protractor or sine-bar for angles. All parts (except base) hardened and ground to close tolerances. Sealed ball-bearings for long-life and accuracy. Two  $\frac{1}{3}$  ct. diamonds and case included—\$150.00 complete.

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- Reasonably priced

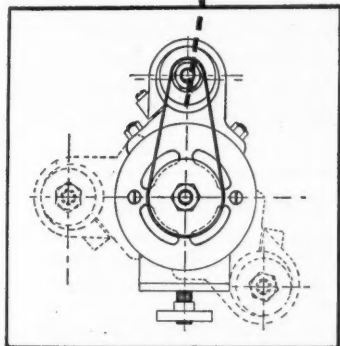
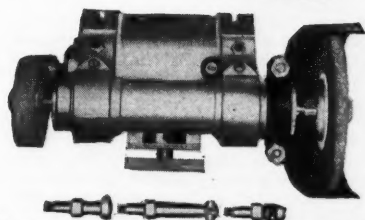
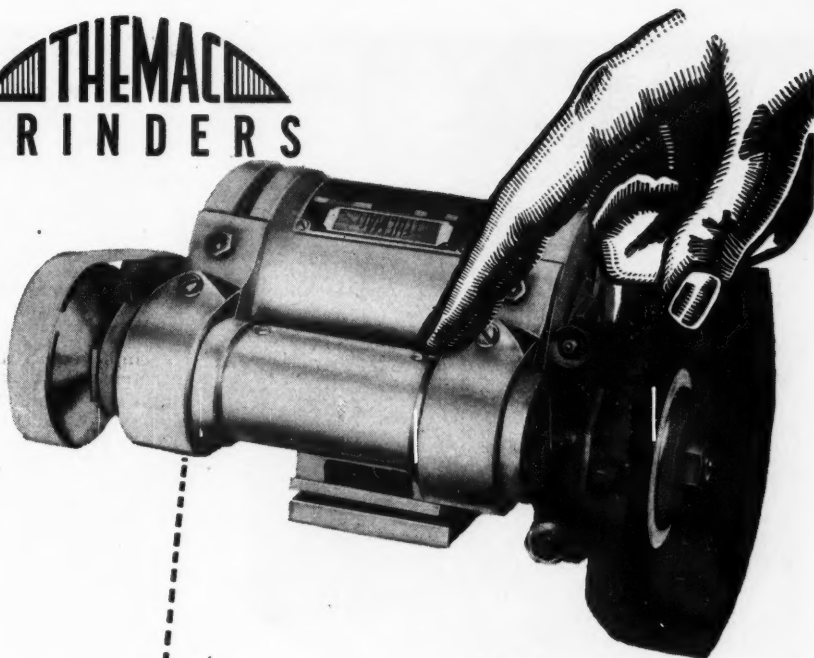
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**J & S TOOL CO.** 477 Main St.,  
East Orange S. N. J.  
Manufacturers of "Fluidmotion" Form Dressers



# THEMAC GRINDERS



The dotted line points to the manually operated eccentric tube. This exclusive THEMAC feature provides proper belt tension at all times.

The sketch to the left illustrates the circumferential adjustment of Spindle Assemblies, which is 270 degrees for Type J-35.

You can do any type internal or external grinding, on any size lathe, with THEMAC grinder Type J-35. Its interchangeable spindle extensions make this a tool of many uses.

Holes  $\frac{1}{4}$ " to  $\frac{1}{2}$ " diameter can be ground to a depth of  $\frac{3}{4}$ ".

Holes  $\frac{3}{4}$ " to 1" diameter can be ground to a depth of  $2\frac{1}{2}$ ".

Special extensions up to 6" in length can be supplied as extra equipment.

Write for catalog describing other features. Sold through your local mill supply distributor.

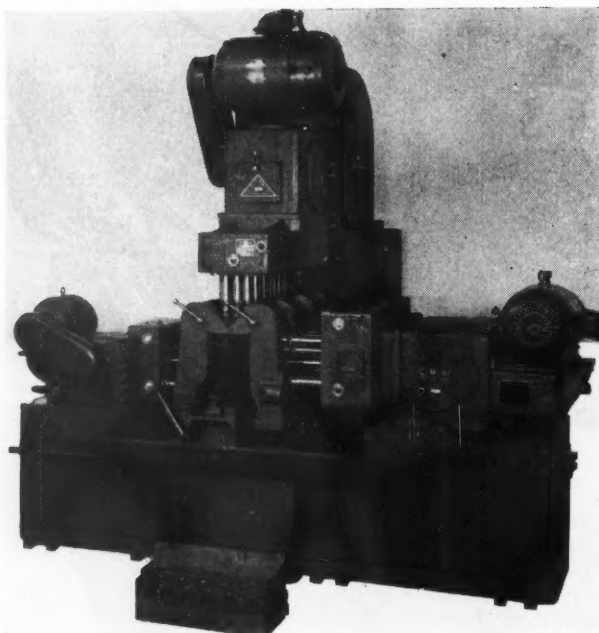
## THE MCGONEGAL MANUFACTURING CO.

135 MOZART STREET

EAST RUTHERFORD, N. J.

April, 1947

MODERN MACHINE SHOP 271



**LeMaire 3-Way Cylinder Block Tapping Machine**

and emergency return, all buttons being plainly marked. The work-holding fixture is designed to easily discharge all chips, and all fixture locators subject to wear are easily replaceable. Manual locating and clamping of the work is employed so as to eliminate the possibility of faulty location when the machine cycle start button is depressed. Extra large chip troughs are provided in the base of the machine. Helical gears are used in all tapping heads, and helical pick-off gears are provided in the standard tapping units. According to the manufacturer, the salvage value of the machine is extremely

high due to the utilization of standard units which can be readily converted for other applications.

ing holes in the part, and hand-operated cam locking toe clamps hold the part firmly over both sides of the top.

The LeMaire 3-Way Tapping Machine is constructed to tap 19 holes in the right side of a cylinder block, 33 holes in the top, and 5 holes in the left side. The machine is said to have a production rate of approximately 86 pieces per hour at 100 per cent efficiency, allowing 30 seconds for loading and unloading a part.

Features of the machine include a conveniently located operating control box having buttons for cycle start, stop, start,

high due to the utilization of standard units which can be readily converted for other applications.

### **Hammond Model CB-77 Chip Breaker and Diamond Finishing Grinder**

A combination chip breaker grinder and diamond finishing grinder designated as the Model CB-77 is announced by



### **A REAL HELPING HAND**

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for price list.

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A difficult production problem of forming two bends in a long length of tubing was solved by "teaming up" two DI-ACRO Benders as illustrated. This dual-forming arrangement saved installation of special machinery. Two accurately formed bends are obtained in one operation—without distortion of the tube and at a cost competitive to power operated equipment. More than 300 pieces are completed per hour—600 individual bends.

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This is but one example of how DI-ACRO precision machines—Benders, Brakes and Shears—can accurately and economically duplicate a great variety of parts, pieces and shapes, without die expense. Write for catalog—"DIE-LESS DUPLICATING".



◀ DI-ACRO is pronounced "DIE-ACK-RO".



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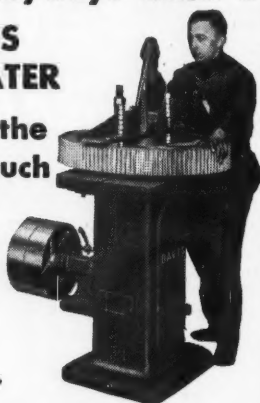
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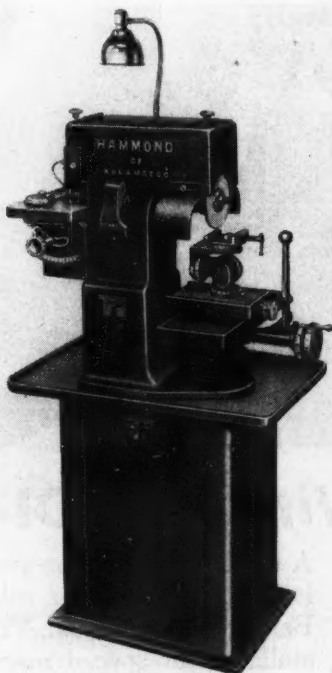
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**DAVIS KEYSEATER CO.**

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Hammond Machinery Builders, Inc.,  
1615 Douglas Ave., Kalamazoo 54, Mich.  
The machine, which provides for rapid  
chip breaker grinding on one side and  
precise diamond wheel finishing on the  
other, is designed to handle all types of  
box and single-point tools and to accom-  
modate all of the required angles.



Hammond Model CB-77 Chip Breaker and  
Diamond Finishing Grinder

According to the manufacturer, every  
wearing point of the Model CB-77 is fully  
protected against the entrance of abra-  
sive material. A drip feed tank of large  
capacity supplies the two wheels by the  
use of a tube for the cup wheel and a  
wick for the straight wheel. Valves are  
provided for controlling the flow of each.

Vibrationless grinding is said to be  
provided for by the heavy construction of  
the machine and an extra heavy preci-  
sion ball bearing spindle, which is driven  
by a V-belt from a  $\frac{1}{2}$  h.p. motor in the  
base. The spindle speed is 3,150 revolu-  
tions per minute.

The Hammond Model CB-77 Chip

# CRITERION *Boring* HEADS



## *Accuracy Accepted*

Extremely high accuracy is a standard feature of Criterion Boring Heads. Moreover, original accuracy is maintained far beyond normal expectation. Lead Screw is ground from solid AFTER hardening.

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Breaker and Diamond Finishing Grinder is supplied complete as shown except wheels but including a compound protractor tool gage, flexible lighting fixture, reversing switch, and  $\frac{1}{2}$  h.p. motor of any electrical specifications. The net weight of the machine is 450 lb. and the shipping weight is 525 pounds.

### "Speed-Cut" Free-Machining Die Steel

"Speed-Cut," a die steel produced by the Vanadium-Alloys Steel Co., Latrobe, Pa., is made with a composition that has proved particularly successful for plastic molds and for die-casting dies for white metal alloys. A unique feature of the steel is its free-machining quality, which permits hardening the steel prior to machining. The steel is furnished in the annealed state or heat treated within the range of 250 to 325 Brinell, as specified.

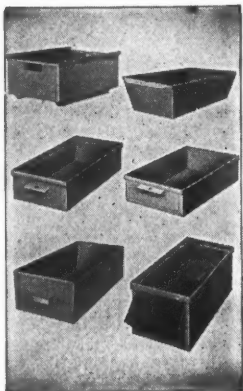
According to the manufacturer, the hardenability of Speed-Cut provides air-hardening properties capable of producing a hardness of 300 Brinell or higher even in very large sections. A still higher hardness can be obtained by oil

quenching, and, when "pack-hardened," a file hard surface with high core hardness can be developed. Little or no movement is said to result from treating.

Speed-Cut is described as a homogeneous steel that does not depend on high sulphur or non-metallics for its free-machining qualities, so that high surface finishes are obtainable from polishing. While not primarily a hubbing steel, it is claimed that shallow and medium depth impressions can be hubbed without difficulty when the steel is in the annealed state.

### Cleveland Horizontal Drilling and Tapping Machine

Designed primarily for drilling and tapping large copper anodes to receive hanging hooks, an improved horizontal combination drilling and tapping machine developed by The Cleveland Tapping Machine Co., Hartville, Ohio, incorporates features which make it suitable for a wide variety of applications in drilling and tapping long and irregular-shaped workpieces. A hand control is provided for indexing the head for consecutively drilling and tapping, and the depth of

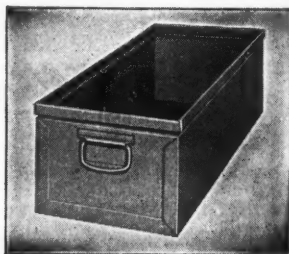


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TIPS. INQUIRIES SHOULD  
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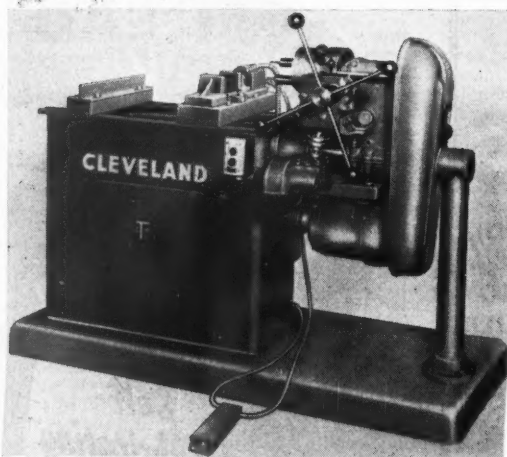


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bearings, D—Safety hood. There's also  
a plain type and selection of cutting  
heads available.

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PIQUA, OHIO



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Cleveland Horizontal Drilling and Tapping Machine

An air-operated vise for holding the workpiece as shown in the illustration, is standard equipment of the machine. However, the air vise can be mounted on a special table which functions as an air-operated cross slide, positioning the work so that it may be drilled and tapped at a number of predetermined points. A work rest may be placed on the ways or on brackets fastened to the end of the column to provide additional support for the

hole and withdrawal of the tool are automatically controlled. A three-position indexing head can also be furnished for drilling, countersinking, and tapping the workpieces with one chucking.

long workpieces.

The machine is powered by a 1 h.p. reversing motor and is designed to drill and tap holes up to  $\frac{1}{2}$  inch, National Coarse Thread, in mild steel.

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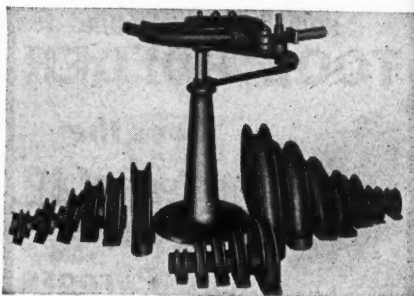
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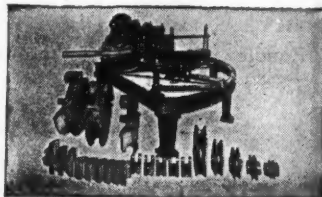
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Place instrument in spindle of boring mill (vertical or horizontal), drill press or jig borer.

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200 - 1000 r. p. m. Bring thumb nail to bear against centering bead until it runs true. Stop machine and focus on work. Keep eye at least 4 inches from viewing aperture.

### ACCURATE

Locate cross lines on work to match lines in viewing aperture.

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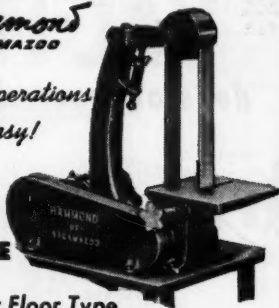
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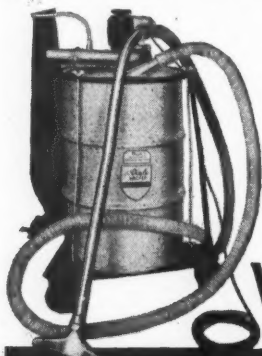
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The powerful suction of the Vac-It also recovers lubricants, coolants or water at the rate of 720 gallons per hour.

Vac-It will make all your cleaning jobs easier, faster and less costly.



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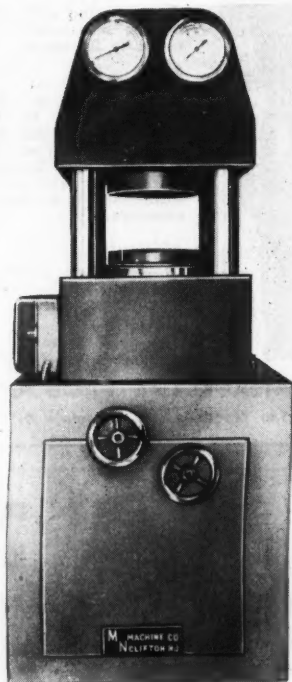
**Doyle  
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**DOYLE  
VACUUM CLEANER CO.**

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## M & N Model 13AS2M Hydraulic Hobbing Press

Described as ideal for laboratory research, a hydraulic hobbing press of 400-ton capacity, designated as the Model



M & N Model 13AS2M Hydraulic Hobbing Press

13AS2M, is now being introduced by the M & N Machine Tool Works, 144 Orono St., Clifton, N. J. An outstanding feature of the press is its compactness of design, which includes four columns, an upward-moving platen, and a completely enclosed base containing a pump and motor. The power connection is the only outside connection on the machine, which can be equipped to retain a complete control over predetermined pressure. Once the controls are set and regardless of the number of times the press is in operation, the pressure is said to remain constantly at the predetermined level.

Specifications of the Model 13AS2M are as follows: ram diameter, 13 inches; opening between rods, 11 inches left to

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CONSTRUCTED AS PER SPECIFICATIONS OF U. S.

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(Die Making Machine)

This is a very heavy, powerful machine and is designed for extra heavy filing and sawing, but it performs small work just as well. This type of machine is usually adopted in Ammunition Plants, Airplane Factories and machine shops where heavy and precision filing and sawing is desired. We also manufacture smaller models—Model D—10" Table; Model E.L.—12" Table. Model No. 14—14" table and heavy pedestals for all our machines.

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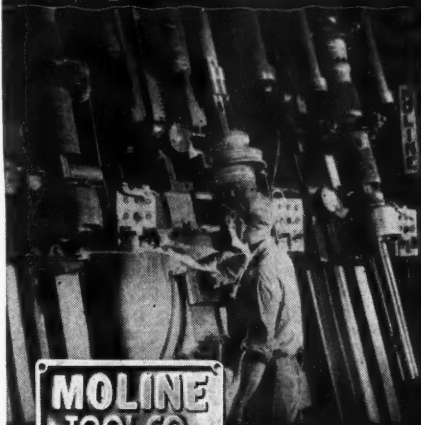


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in any of these operations, where precision work is demanded and where greater production at man-hour savings is paramount—

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Moline, Illinois

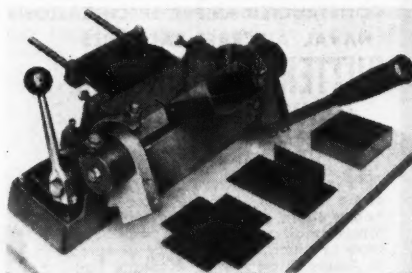
right and 18 inches front to rear; daylight opening, 12 inches; diameter of columns,  $3\frac{1}{4}$  inches; maximum stroke,  $4\frac{1}{2}$  inches; type of pump, dual; pump motor, 3 h.p.; height to platen, 42 inches overall height to column, 72 inches; floor space, 28 x 28 inches; height of base, 30 inches; and approximate weight, 2,450 pounds.

### "Di-Acro" Redesigned Brake

A complete redesigning of its "Di-Acro" Brake for die-less duplicating is announced by the O'Neill-Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. The brake is offered in four sizes of 6, 12, 18, and 24 inches, each of which has a material capacity of 16 gauge cold rolled sheet steel.

Extremely flexible, the Di-Acro Redesigned Brake is said to rapidly duplicate intricate parts to a high degree of accuracy in a wide variety of materials such as copper, bronze, stainless steel, aluminum, bi-metals, sensitized materials, varnished cambrics, and dielectrics. A high rate of production is claimed to be obtained with the brake as a result of its well balanced construction, Torrington roller bearings, and the ease with which it can be arranged for various

forming operations. The forming blade of the brake is properly hardened and ground to ensure lasting accuracy. For



Forming a Box with "Di-Acro" Brake No. 1

unusual duplicating operations, the standard forming blade can be quickly removed and replaced with special blades easily prepared from stock materials.

Additional features of the Di-Acro Redesigned Brake include sensitive material clamping action that provides for maximum accuracy and sharper bends; reversible double-edge forming blade

**Frax "ALL-ANGLE"**  
**MILLING ATTACHMENT**



**EASY TO HANDLE**  
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It is an all purpose attachment which has thoroughly proved itself all over the world. Ideal for the making of plastic molds, die casting molds, permanent mold casting molds, metal patterns, tool and die making, production work of all kinds, as well as for grinding, drilling, boring, etc.

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The precision  
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- Assures new-tool efficiency on re-grinds.
- Makes duplication of angles easy.
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**MANUFACTURERS OF OPTI-TOOLS**



Girl Operator Using "Di-Acro"  
Brake No. 2

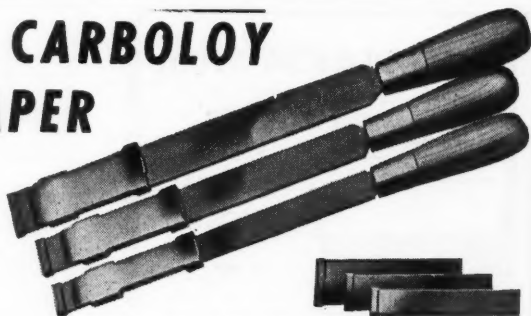
ly close reverse bends; precision angle degree stops that are quickly adjustable for accurately controlling the angularity of all bends formed; sensitive material gauge for assuring precision in all duplicated parts; material support for increasing accuracy in the gaging of lightweight materials; two different handle positions which allow operator choice for both convenience and greater production in forming either light or heavy materials; and sturdy reinforced and ribbed machine tool gray iron base that affords complete material clearance at forming center

with both a wide and narrow working surface to allow for forming of extreme-

line and assures complete rigidity and continued accuracy.

## Anderson CARBOLOY TIPPED SCRAPER BLADES

Speed up scraping operations with these efficient blades. They are especially good for hard alloy iron and the extremely hard bronze castings. If you are already using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove the high-speed steel blade and slip in the Anderson Carboly Tipped Blade. They are available in three widths.



THEY LAST 8 TO 10 TIMES LONGER

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**ANDERSON BROS. MFG. CO., Rockford, Ill.**



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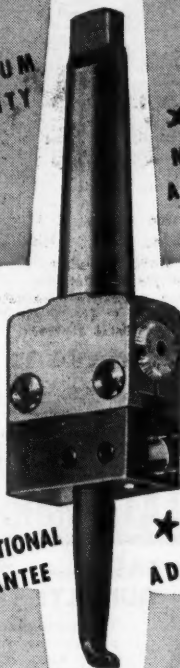
**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 7, U.S.A.

# The MAXWELL

Precision Boring Head

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MAXIMUM  
CAPACITY

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MAXIMUM  
ACCURACY



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ADJUSTMENT

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MAXIMUM QUALITY

★ MINIMUM PRICE

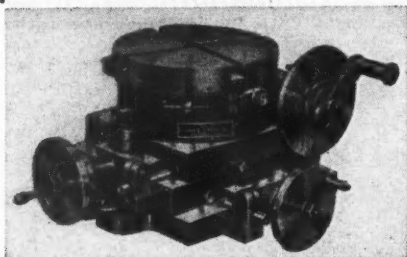
• sizes from \$44.00 to \$105.00. Boring capacity  $\frac{1}{8}$ " to 15". Available with any standard shank. Immediate delivery from stock. Circular upon request.

**THE MAXWELL CO.**

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## No. 1 COMPOUND TABLE

With 7½" Dial Type Rotary Table Mounted



We also make a No. 2 Size for 12" Rotary Table. Can be had without Rotary Table.

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No. 4



The nameplate on your product is your signature; keep it neat and legible! Accurate location and alignment are assured with this NAMEPLATE DETAIL PRESS. Write for particulars.

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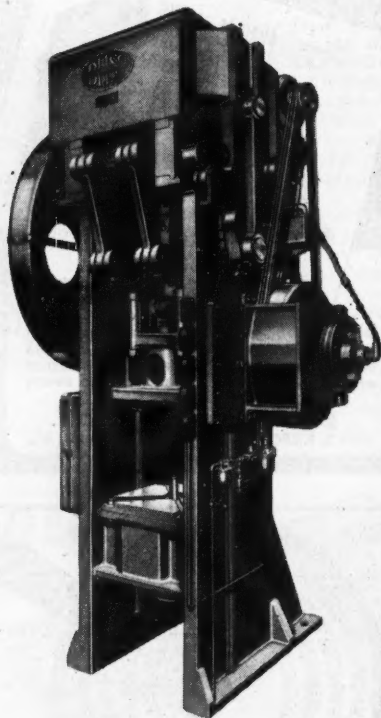
**GEO. T. SCHMIDT, INC.**



1806 W. BELLE PLAINE AVE.  
CHICAGO • 13 • ILLINOIS

## Bliss Single-Crank Toggle Press

Designed for deep drawing operations on steel, brass, copper, aluminum, and other metals, a single-crank toggle press is now being offered in eight sizes rang-



Bliss Single-Crank Toggle Press

ing from 4¼ to 7-inch shaft diameter and from 8½ to 24½-inch stroke length by the E. W. Bliss Co., 450 Amsterdam St., Detroit, Mich. The design features steel-weldment construction, thus resulting in weight savings and providing for reduced floor space requirements. Operating speeds, stroke lengths, and die-space dimensions are the same as those for previous models, thereby permitting interchange of tools.

Assembling and servicing are facilitated by the construction of the press, which incorporates a redesigned toggle driving mechanism that provides a cross head with long guides at the position

## Mfg. of Precision BROACHES

Standard keyway broaches  
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We make a specialty of sharpening, reconditioning and converting broaching tools.

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Gits Gravity Feed Oiler controls oil flow by simple turning of a knurled screw. Flow can be shut off completely during idle periods. The transparent reservoir shows quantity of oil present, and rate of flow may be viewed at all times through a sight glass in the shank. Available in several models, Gits Gravity Feed Oilers are especially adapted to high vibration operations. Sizes, models, prices on request.

Write for the Wealth of Lubricating Information in Gits Catalog No. 60.

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*Exclusive for over 35 years*

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### SLOTTED ANGLES

In 19 sizes, ranging from  
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Over 50 sizes, ranging from  
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In 13 sizes, ranging from  
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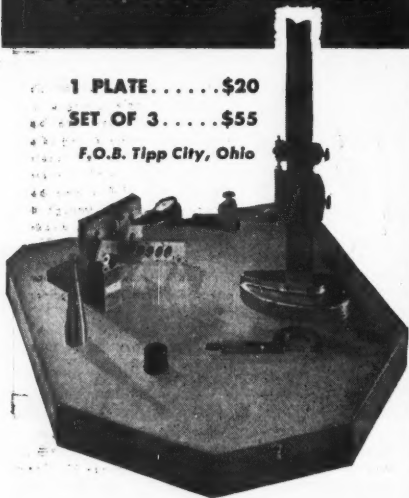


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Profilm Laminated Glass Surface Plates are finished to .00005" surface accuracy. No sticking, no vibration of gages. Made of 5 to 16 layers of glass they are laminated for greater strength and durability.

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Free Folder on a new Profilm Service. Write today, Dept. D.

## PROFILM CORP.

PHONE TIPP CITY 5151

P. O. BOX 175

DAYTON, OHIO

most needed. Steel rockshafts, yokes, and links are provided in the toggle-driven blank-holder mechanism.

The clutch of the machine is of the single-disc friction type with one-station push-button control, and an air brake for stopping the flywheel is included.

The press frame is a one-piece weldment of stress-relieved steel. A single drive crankshaft and single-end blank-holder drive are employed. The press also features as standard equipment radially T-slotted bolster plates and direct-connected adjustable bottom liftouts to leave the space between the uprights free and clear.

The press incorporates steel gearing which is fully guarded to approximately 8 feet above floor level. Single helical or herringbone gears may be furnished as extra features. A manifold lubrication system with metal tubing leading to each bearing is standard equipment. The drive shaft and flywheel of the press are roller-bearing equipped. The crankshaft, rockshaft, intermediate shaft, and link-pin bearings are bronze bushed.

## Bruning Model 91 BW Volumatic Printer-Developer

Incorporating features of design which are said to speed and facilitate print production, the Bruning Model 91 VW Volumatic Printer-Developer illustrated herewith has been introduced by the Charles Bruning Co., Inc., 4754 Montrose Ave., Chicago 41, Ill. Requiring only one operator, the unit is intended for the large-volume production of cut sheets, and is designed to accommodate roll stock up to 42 inches wide. It prints and develops all Bruning BW mediums, including light, regular, or card-weight BW paper prints with black or colored lines on white backgrounds; black or colored line paper prints on green-tinted backgrounds; transparent paper prints; and cloth or film prints. These prints are said to be produced in volume at speeds up to 30 feet per minute.

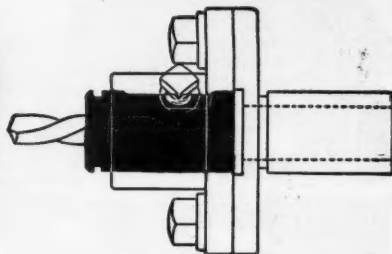
One of the outstanding features of the Bruning Volumatic is the extra-large feed board, providing more than 13 square feet of space for handling large volume production without crowding. The sensitized medium and original copy are drawn into the machine by a vacuum feed and are held in close contact with each other as they are conveyed to the light source. In roll stock production, the stock is drawn over a ball-bearing mounted stainless steel roller smoothly and without dragging.



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Now available for all types of tool holders and turrets. Tremendous gripping power prevents drill slippage—extreme accuracy and parallelism assured. Sold in sets or individually as low as \$1.25 each.

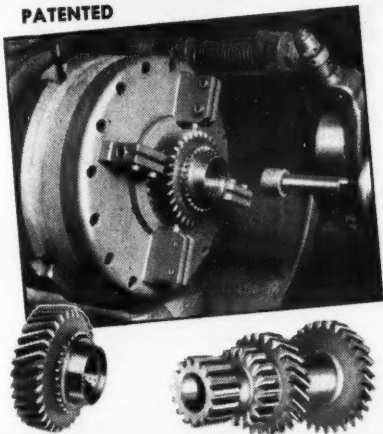
### Brown & Sharpe Set Prices

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Set No.	Holder Number	Bushing Size		Range of Set in 64ths	No. of Pieces	Net Price with Case
		Dia.	Length			
SB-103	00 AC 10-A	1/2	3/4	1/8 to 7/8	17	\$20.00
SB-105	11A 20 BA	3/8	1-1/8	1/8 to 7/8	25	\$31.00
SB-106	12B-14 22B	1	1 1/4	1/4 to 3/4	33	\$54.30

THE H. C. CLATFELTER COMPANY  
FERNDAL 20, (DETROIT) MICHIGAN

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Look, a high speed, precision chuck with no parts to wear out! Result: Maximum accuracy, minimum maintenance! Because the Woodworth design assures the ultimate in concentric chucking. Obviously, it will solve your precision chucking problems, as it has already for large manufacturers of gears and other production parts. Send your precision chucking problems to us—at no obligation.

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Bruning Model 91 BW Volumatic  
Printer-Developer

mechanism instantly. A speed control knob and an easily read calibrated dial enable the operator to change to any printing speed within range of the machine. A light shield control knob permits the operator to reduce light exposure in any percentage up to 50 per cent. Pressure on a foot pedal releases tension on the contract bands instantly so as to enable incorrectly fed roll stock to be easily realigned.

According to the manufacturer the Bruning Volumatic assures uniformly developed prints at all speeds. The developed print is exposed to the operator's view before it enters the drying unit, thus permitting the operator to correct light intensity before exposing the next print. After development, finished prints are delivered into a stacking tray at the rear of the machine. A simple ad-

Simplicity of operation is an additional feature of the unit, all controls being located within easy reach of the operator at all times. One "on-and-off" push button controls all electric motors and heaters, starting or stopping the entire

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WISE • VALVE • HOSE

*Speed* } DRILLING • ASSEMBLING  
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WAY

Original Electric Etcher. Thousands in Daily Use

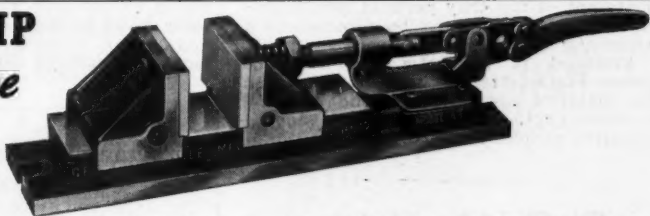
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides — quickly — plainly. • Three sizes to meet all requirements.

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Hudson Terminal Bldg. New York 7, N. Y.

## EQUI-GRIP *Speed Vise*

**FAST PRODUCTION**  
with  
**PRECISION & SAFETY**



**SPEED**—Single lever action. A short down pressure on toggle lever closes and locks the jaws. Upward to unlock and open them. What vise can give greater speed with safety?

**WIDE OPENING**—When needed, full lever action retracts live jaw up to  $1\frac{1}{4}$  inches. Maximum opening between jaws in closed position 3 inches.

**PRESSURE CONTROL**—Through an adjustable spring. When once adjusted for a production piece, pressure remains the same throughout the run, insuring against distortion by excessive pressures.

**PRECISION**—Top, bottom, and the flush sides are machined to perfect right angles.

**SAFETY**—Clamping action is downward. No danger of operator's hand slipping into cutters.

Available in 3" and 6" sizes with special jaw plates  
or fixtures for each.

## GEORGE - ANDERLE MANUFACTURING CO.

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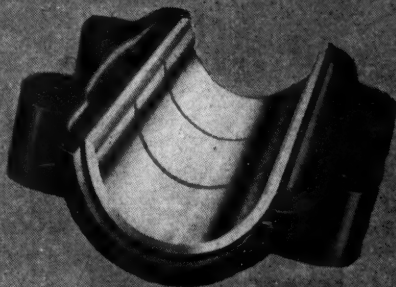
DAYTON 6, OHIO

### Before You Rebabbitt . . .

It will pay you to send for and read the MAGNOLIA BEARING METAL Bulletin. It contains valuable information on how to get the best results when you use MAGNOLIA ANTI-FRICTION BEARING METAL or the other special purpose Bearing Metals.

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Warehouses in Ft. Worth, Chicago, San Francisco and Montreal

justment of the tray permits prints produced on roll stock to be directed to a trimming table.

Finished in an attractive two-tone green Hammertone, the Volumatic can be installed anywhere in the drafting room or engineering department, since it requires no plumbing or venting.

### "Die Slick" No. 5 Lubricant

Designated as "Die Slick" No. 5, a special metal-working lubricant designed for extremely high pressures and/or high temperatures is announced by G. W. Smith & Sons, 5400 Kemp Rd., Dayton 3, Ohio. Intended for use on ferrous or non-ferrous metals, the lubricant is said to be effective for such applications as hot drawing, hot piercing punches, hot forging, deep drawing, and numerous other jobs to prevent scoring and sticking of metal being formed.

According to the manufacturer, Die Slick No. 5 Lubricant will withstand pressures of more than 100,000 p.s.i. and can be used with temperatures up to 2,300 deg. F. Applicable with either a brush, swab, or spray, it is said to prevent scoring and sticking and to increase die life and speed production. The compound,

which contains no graphite, will not discolor workpieces, is non-corrosive and non-carbon forming, and causes no objectionable smoke or gases, it is claimed.

### Bliss Improved Second-Operation Spinning Lathe

An improved second-operation spinning lathe which can be used to bulge, neck, bead, wire, flange, curl, and trim a variety of drawn or spun shells is announced by the E. W. Bliss Co., Detroit 2, Mich. Not recommended as an alternative to the toggle press for producing shells from flat discs, the lathe is primarily intended to supplement the aforementioned machine by rapidly performing secondary spinning operations on products previously drawn in presses and at a rate commensurate with the primary operation.

By using welded steel construction for the frame, the lathe can be furnished with a fully enclosed V-belted motor drive and gearbox without any increase in weight above that of the bare machine as furnished in the old design. A combination multiple-disc friction clutch and brake is said to ensure instant stop-

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**I**nterchangeable  
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**DRILL JIG BUSHINGS**

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Acme Industrial Company

## HEAVY-DUTY BENCH-TYPE ENGRAVING MACHINE



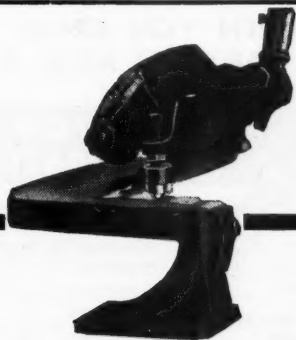
**THE PANTO  
MODEL UE-3**

**LIGHTER MODELS UE and UE-2**

Interchangeable heads for engraving, electrical marking, and acid etching . . . available for all models. Also Panto engraving cutters, cutter grinders, master copy type, endless belts, and accessories.

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Cuts straight and irregular shapes faster—better! Order No. 1 for 14 ga. (with High Carbon, High Chrome Blades for 18 ga.); No. 2 for 10 ga. (with H.C.H.C. blades for 14 ga.); and No. 3 for  $\frac{1}{8}$ " mild steel or 10 ga. stainless. Write for catalog!

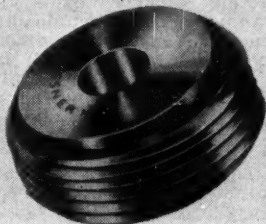
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3004 W. 111th St., Dept. 3, Chicago 43, Ill.

**SOSSNER'S**

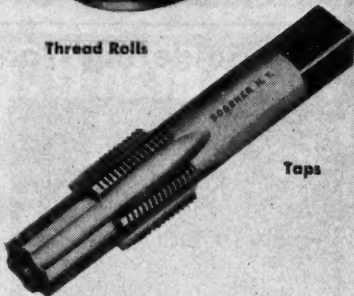
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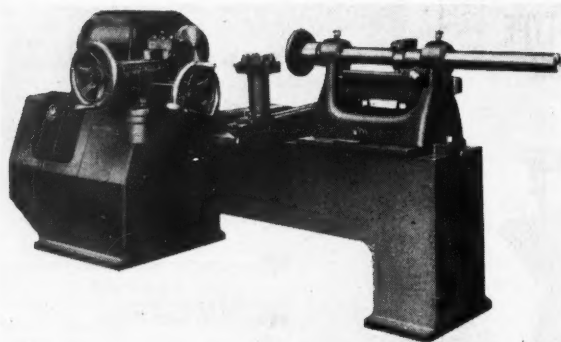
Sossner's amazing long-life Mirror-Finish has been developed to give greater production of superior precision parts. It is included on ALL Sossner taps, standard or special, and thread rolls.

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# SOSSNER

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27 BROADWAY, LYNNBROOK, N. Y.





Bliss Improved Second-Operation Spinning Lathe

ping and starting which, together with the fast-acting tailstock toggle clamp, allows for rapid loading and unloading of the machine. The offset adjustment of the tailstock permits the use of inside form rolls for many necking operations.

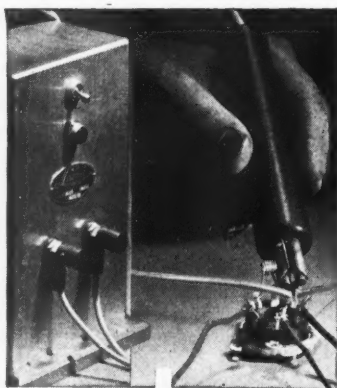
The Bliss Improved Second-Operation Spinning Lathe is offered in two sizes with up to 30-inch swing and 92-inch bed length. The headstock spindle is supported on Timken bearings and can be operated at infinitely variable speeds of

vides maximum rigidity for the frictionless spinning and burnishing tools and minimizes the manual dexterity necessary for consistent long-run production. Attachments available include a wiring rest, operated by a tilting lever, that can be pivoted to approach the work from any desired angle. Also available are a standard tilting rest for combination trimming and wiring, and a special trimming attachment for straight shells without flanges.

275, 365, 615, and 1,140 r.p.m. in the case of the model No. 15 and at speeds of 180, 370, 675, and 1,140 r.p.m. in the case of the Model No. 16. The Model No. 15 weighs 1,500 lb., while the Model No. 16 weighs 3,000 lbs.

Lateral and longitudinal handwheel control of the compound rest provides

## LUMA Soldering Tool



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The tool of a hundred uses. For all soldering jobs large or small. No warming-up time required—heats instantly. Low maintenance. Safe and easy to operate. *Write for details.*

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**\$1.50 to \$2.20**  
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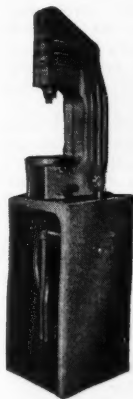
94 Allyn Street

Hartford 3, Conn.



## Air-Hydraulic 6-Ton Press

Air-Hydraulics, Inc., 401 Broadway, New York 13, N. Y., announces the addition of a 6-ton capacity press to its line of Air-Hydraulic equipment. Available in both bench and floor models, the press can be used for assembly, riveting, embossing, staking, sizing, crimping, flanging, and other operations on metals, plastics, and leathers.



Air - Hydraulic 6-Ton Press

Designed to provide for smooth, quiet operation, the Air-Hydraulic 6-Ton Press is supplied ready for plugging into an available air line and functions on a 120-to-1 ratio on the air intake pressure. Ram pressure is quickly and easily adjustable and can be controlled to predetermined specifications from delicate pressures up to high pressures of 12,000 lb.

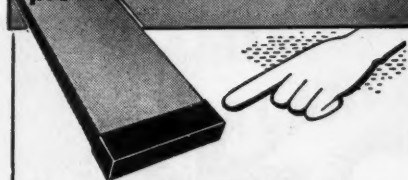
The same pressure is said to be delivered throughout the entire length of the ram stroke. The ram speed is adjustable from the slowest action up to 300 inches per minute; the stroke is adjustable from  $\frac{1}{4}$  to 5 inches. The press can be furnished with a predetermined ram dwell or for single cycle or automatic action. Since foot, hand, or solenoid push-button control valves are used, the press is claimed to be ideal for women operators.

## Sheffield Improved Automatic Segregating Instrument

An improved automatic segregating instrument for the rapid and accurate inspection of compression and oil piston rings has been designed by The Sheffield Corp., Dayton 1, Ohio. The instrument is constructed to automatically check thicknesses to a tolerance limit of 0.0005 inch and gap width to a tolerance of 0.007 or 0.010 inch, and to segregate rings at a rate of 2,400 per hour.

After the instrument has been set up using piston rings of known minimum and maximum dimensions as masters, the operator places the rings to be inspected in a three-finger stack holder with the gaps arranged so that they fit

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Fortman Scrapers are tipped with super-hard CARBOLOY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

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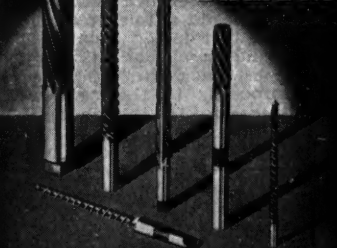
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Manufacturers of

The Gammons Helical Tap  
The Gammons Helical Chasing Reamer  
The Gammons Helical Die Making Reamer  
The Gammons Duplex Tap  
The Gammons Special Reamer

**THE GAMMONS-HOAGLUND CO.**

MANCHESTER

CONNECTICUT



Sheffield Improved Automatic  
Segregating Instrument

the ring be either oversize or undersize, the Electrichek gaging head operates mechanisms which automatically open trap doors and the ring passes either into the undersize or oversize compartment.

If all dimensions are within tolerance limits, the piston ring proceeds through all the gaging stations and down a chute into a receptacle for accepted units. The parts that have been rejected because of undersize gaps and oversize on thickness can be salvaged and reworked.

### Dravo Counterflo Heater

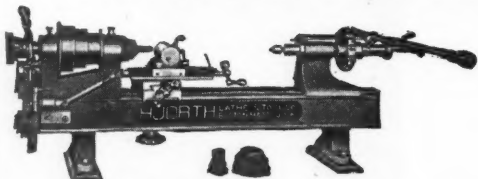
Development of the stainless steel combustion chamber for its commercial and industrial direct fired heater has just been announced by Dravo Corporation, Neville Island, Pittsburgh, Pa. By using this material for combustion chambers, Dravo engineers assert that the life expectancy of these heaters has been greatly increased since stainless steel has such high resistance to oxidation.

Refractory lining, which has always been considered necessary with carbon steel chamber construction, is completely eliminated in the new type. As a result, it is lighter in weight and more compact in size, making possible a much wider range of application. For instance, suspended heaters may be located in the

the rail on the back finger. This ensures all rings passing through the various gaging stations in the same manner and, by pressing the start button, they are automatically fed into proper position.

The first gaging station compresses and checks the ring for undersize, oversize, and within tolerance width gaps. If the dimension is out of tolerance, the ring is automatically rejected, removed from the gaging slide, and placed in a special compartment. When the gap is correct, the ring proceeds to the next station where it is checked for thickness. Should

### ... for more than 1001 odd jobs



The Horth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Horth Lathe.

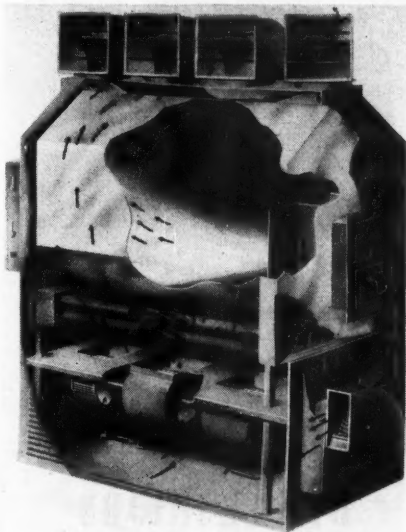
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HJORTH LATHE & TOOL CO.

8 BEACON ST., WOBURN, MASS.

building roof trusses, either vertically or horizontally, depending on the head room. Installation is very simple, requiring only fuel line, power line and vent stack. They can be arranged to utilize either gas or oil as fuel, and can be converted readily from one to the other.

In this type of heating, developed by Dravo, warm air is discharged horizon-



Dravo Counterflo Heater with Stainless Steel Combustion Chamber

tally over the floor above the workers' heads at a flow rate of about 2000 ft. per minute, enabling wide floor areas to be covered without the use of ducts. The flow rate of the returning air, coming from all directions, is so low that there is no appreciable draft even a few feet from the heater. This method of recirculating the air at working levels provides maximum worker comfort and minimizes heat losses through the roof.

Eight different sizes have been developed, ranging from 400,000 to 2,000,000 Btu per hour. All are of the same basic design and are completely equipped with modern safety devices. Dimensions range from 2 ft., 7 inches wide by 4 ft., 11 inches long by 8 ft., 1 inch high for the smallest model, to 4 ft., 9 inches wide by 9 ft., 5 inches long by 12 ft., 9 inches high for the largest.

## MACHINING ALONE CAN'T CORRECT

# DY-NAMIC UNBALANCE

Save shop time, add years to product life, with a low-cost, quick-acting Bear Dy-Namic Balancer!

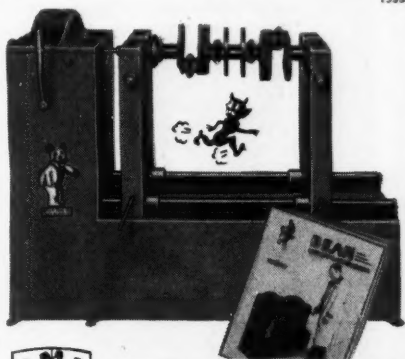
### Get FREE Catalog!

Every day, production-sampling tests prove definitely that workmanship, however fine, simply cannot insure dy-namic balance in rotating parts. And since destructive un-balance increases enormously as RPM steps up ... and since the resulting "Wobblies" are discovered by the user and not in your shop ... scientifically accurate dy-namic balancing is essential if your products are to serve better and sell easier.

### Now Dy-Namic Balancing Is Quick, Easy, Low-in-Cost!

With a low-priced Bear Dy-Namic Balancer, the job is done to meet any standard requirements, in routine production, in a matter of seconds, and any shop hand can learn to operate a Bear Balancer in a few hours! Bear machines are available for balancing bodies from a few ounces to two tons. Write for the Bear Catalog! Bear Mfg. Co., Dept. M-25, Rock Island, Ill.

1533



# BEAR

COMBINATION

STATIC AND DY-NAMIC BALANCING MACHINES

## Hammond Model ROL Polishing and Buffing Lathe

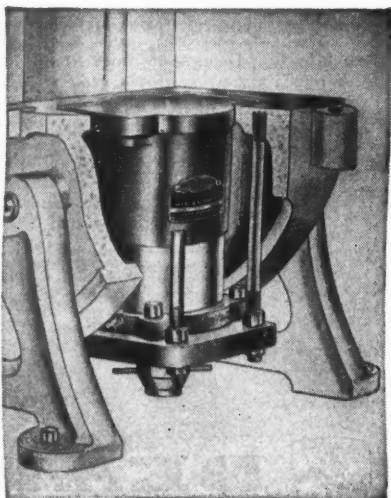
A recent addition to the Hammond of Kalamazoo line of polishing and buffing lathes offered by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich., is the Hammond Model ROL Polishing and Buffing Lathe illustrated herewith, which is designed for finishing small parts, color buffing, brushing, and light cut buffing and polishing. The machine, which has an 8-inch overhanging spindle, can be furnished with a 2 or 3 h.p. motor and with any one spindle speed of from 1,200 to 3,600 r.p.m. A multi-V-belt drive is provided from the motor to the spindle, the speed of which can be changed by replacing the motor sheave. The motor is mounted on a hinged plate to allow for easy adjustment of belt tension.

Constructed with an overhanging base to provide for ample working space around the wheels, the Hammond Model ROL Lathe is standardly equipped with a 2 or 3 h.p., 1,750 r.p.m., ball bearing, general-purpose motor for operation on 220/440 or 550 volts, 2 or 3-phase, 50 or 60-cycle current. Both ends of the spindle are tapped for taper points. In addition, the machine is furnished with a magnetic motor control having overload and low-



Hammond Model ROL Polishing and Buffing Lathe

voltage protection; push-button station; and combination brake and switch with spindle lock.



## Die Cushions

for

### Every Punch Press Requirement

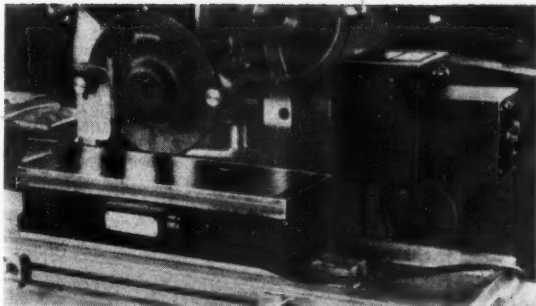
For deep drawing operations.

For pressure pad control on form dies.

For stripping blanks and ejecting slugs.

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Catalog No. 100-12.

**DAYTON ROGERS  
MANUFACTURING CO.**  
Minneapolis 7, Minnesota



**"Neutrofier" Combination Rectifier and Demagnetizer**

By a snap of the control, the Neutrofier is said to demagnetize the magnetic chuck and parts completely and automatically, a few seconds being required for the demagnetizing operation. Besides use as a holding device, the magnetic chuck can be used for demagnetizing

many other parts that may have become magnetic from other operations.

### **"Neutrofier" Combination Rectifier and Demagnetizer**

The Hanchett Manufacturing Co., Big Rapids, Mich., is now furnishing its laminated top Hermeti-Coil magnetic chuck, size 6 x 24 inches and smaller, with an a.c. combination rectifier and demagnetizer known as the "Neutrofier." The compact unit may be mounted in any location at the convenience of the operator and can be furnished for operation from any alternating current outlet.

### **G-E Flaw Detector**

A flaw detector which is designed to continuously detect and count holes, weak spots, and conducting paths in thin materials, such as paper, sheet rubber, sheet mica, varnished cloth, plastic materials, and enamel films on wire during the manufacturing process, has been an-

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The WICACO Continuous Oil Groover can cut grooves of all descriptions INTERNAL or external — CONTINUOUS or intermittent.

Operators need no special training to produce oil grooves with this highly flexible machine. Change from one grooving job to the next is readily done without delay. Its upright spindle and chuck permit rapid loading and unloading of work without stopping the machine.

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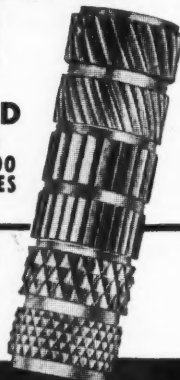


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**REED ROLLED THREAD DIE CO.**  
Formerly, ROLLED THREAD DIE CO. and REED SMALL TOOL WORKS

*Knurls - Thread Rolling Dies and Machines*  
WORCESTER 2, MASSACHUSETTS, U. S. A.

nounced by the Special Products Div., General Electric Co., Schenectady 5, N. Y. The instrument permits quality standards to be set up close to the point of manufacturing so that variations in quality can be quickly detected and correct adjustments made with a minimum of waste. Applications include detecting places of low dielectric strength in insulating materials, and holes in materials which must resist passage of light or air.

The G-E Flaw Detector can be ap-

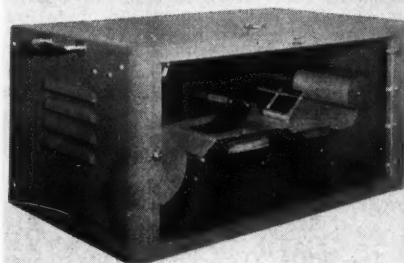
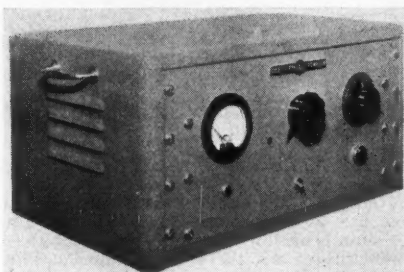


Illustration showing G-E Flaw Detector together with two types of electrodes

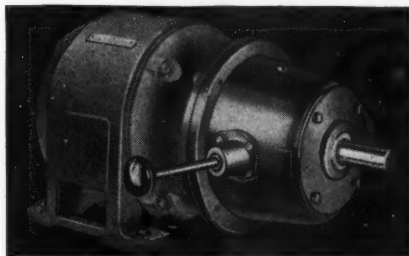
plied to sheet materials up to 0.25 inch thick moving as fast as 450 feet per minute and to wire moving up to 100 feet per minute. The device consists of an electrode assembly through which an adjustable voltage is applied to the material undergoing test, and an electronic circuit that indicates the flow of current through the material which occurs when a flaw passes under the electrode. Electrodes have been especially designed for use with specific materials.

The G-E Flaw Detector can be made to sound an alarm, operate a recorder, or stop the manufacturing process when flaws are encountered, and can be arranged to indicate when flows exceed a given total.



## Western Two-Speed Motor Transmission

A two-speed motor transmission which is designed to provide special ratios is announced by the Western Manufacturing Co., 3400 Scotten Ave., Detroit 10, Mich.



Western Two-Speed Motor Transmission mounted on 5 h.p. motor, 1,800 r.p.m. frame No. 254 with flanged-type end shield

Direct motor speed, neutral point, and any desired reduction up to 6.25 to 1 are obtained through an automotive-type gearshift lever. Standard reductions are

1½ to 1; 2 to 1; 3 to 1; and 4 to 1.

Models manufactured for application to motor frames Nos. 224, 225, and 254 are mounted on flanged-type end shields and can be swiveled about on the face of the flange so that the shifting lever may be in any one of three different positions, 90 deg. apart (either one of two horizontal and one vertical position). In the larger sizes, the transmission is made with a modified base mounting, corresponding with the legs of the motor frame.

## University Surface Finish Standard Set

Produced by the University Machine Company, a surface finish standard set which is said to provide a convenient, quick and accurate on-the-job comparison of surface roughness is now being marketed by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass. According to the manufacturer, the fact that the set contains original machine samples ensures accurate factual comparisons since the human fingernail is able to detect the minute variations raised by the machining operation.

## Square, Straight Tapping in HALF THE TIME



The Dahlstrom Tap Guide practically eliminates tap breakage, and turns out uniform work. Just fasten it to a post or bench, slip a Tap Adaptor into the spindle, and turn the handle. Equipped with 7 Adaptors from 8-32 to ½" (taps not furnished). Literature on request. Dahlstrom Mfg. Co., 418 S. Sixth St., Minneapolis 15, Minn.

**Dahlstrom TAP GUIDE**

## High Speed COUNTERBORES

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SPOT  
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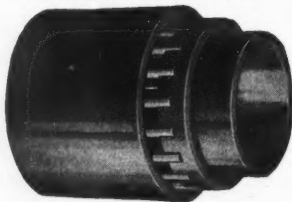


... because they're made of a special, correctly - heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

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## GWILLIAM JOURNAL ROLLER BEARINGS



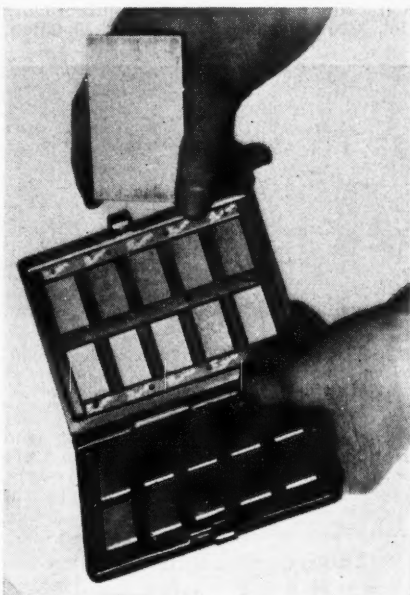
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**THE GWILLIAM CO.**  
358 FURMAN STREET  
BROOKLYN 2, N. Y.

The set consists of 20 small stainless steel original machine-cut specimens ranging from 2 to 500 microlines in surface roughness. Included are polished,



University Surface Finish Standard Set

ground, shaped, milled, and turned specimens which are individually positioned in a handy pocket-size folding case made of a die-cast magnesium alloy. Each sample is clearly marked with its roughness value.

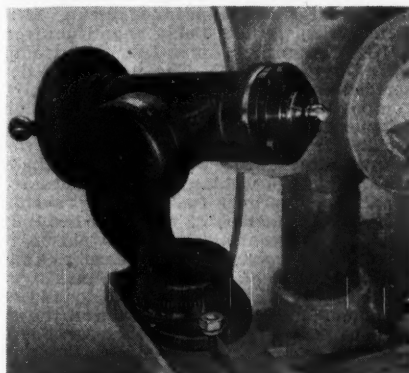
## I-G-C Model 100-B Relief Grinding Fixture

A recent addition to the line of relief grinding fixtures manufactured by the Accurate Machine Products Co., 1640 S. Hobart Blvd., Los Angeles 6, Calif., is the I-G-C Model 100-B which is designed to handle countersinks of all types, center drills, integral pilot cutters, and pilot drills, either right or left hand. It is also said to be useful for any type of small tool cutter grinding, such as the sharpening of end mills, spotfacers, and small milling cutters.

The mounting knee has been redesign-

ed so that the working head of the fixture can be set in any desired position, thereby affording the correct rake or clearance angles to the cutters to be ground. Additional improvements include a new head with special built-in indexing pins.

The I-G-C Model 100-B Fixture is designed to fit any standard grinder and



I-G-C Model 100-B Relief Grinding Fixture

to handle work from  $\frac{1}{8}$  to 1 inch in diameter with standard collets. The lift of the single cam is variable from 0.001 to  $\frac{1}{8}$  inch. Adjustment pins are provided for 1, 2, 3, 4, and 6-fluted cutter grinding. The spindle of the fixture is made of hardened and ground steel, and the cam and pins are of hardened tool steel. The body and knee are cast iron with an attractive mottled finish.

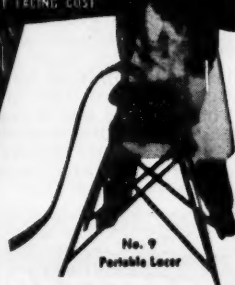
The Model 100-B is supplied complete, ready for installation, with one Hardinge Type 5-C collet and two wrenches. The weight of the unit is  $22\frac{1}{2}$  pounds.

### Bardco Bench Grinder

A bench grinder featuring a special small diameter motor has been announced by the Bardco Mfg. & Sales Co., 2450 E. 23rd St., Los Angeles, Calif. An outstanding advantage claimed for the unit is the absence of any projection in the working area between the two grinding wheels, thus not only permitting unobstructed motion of the work but also the use of the grinding wheels for an unusually long period of time. Since the diameter of the motor is approximately equal to the diameter of the retaining

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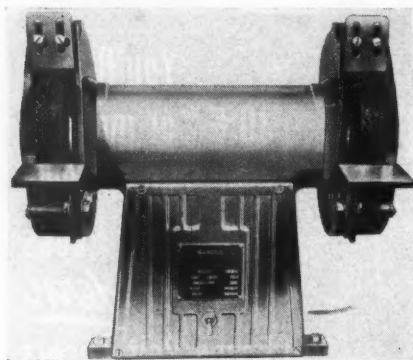
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In over 30 years experience manufacturing belt lacing equipment *exclusively*, Clipper has developed the world's finest belt hooks. To get the best service from these top quality hooks apply them with a modern belt lacer such as the Clipper No. 9 Portable. This combination will save you money. See your Mill Supply Jobber for demonstration.

CLIPPER BELT LACER COMPANY, Grand Rapids 2, Michigan





Bardco Bench Grinder

rings of the grinding wheels, the entire grit portion of each wheel can be utilized.

The grinder base and motor housing are cast aluminum and are smoothly designed to shed dust and metal particles. The machine has a speed of 3,600 r.p.m. and is available in models having 7, 8, or 10-inch wheels. Standard equipment includes two high speed organic-bond

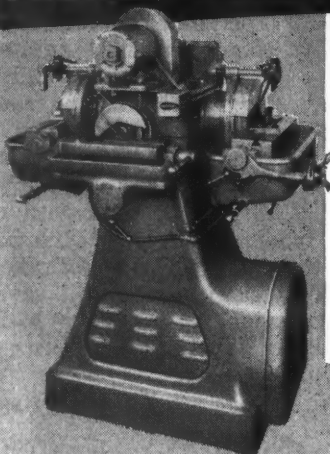
wheels (one coarse and one medium); two enclosed wheel guards with adjustable tool rests and spark shields; and built-in toggle switch.

### "Pom" Improved Arc Welding Compound

"Pom," an improved arc welding compound designed to produce clean, efficient welds, is now being manufactured by G. W. Smith & Sons, Inc., 5400 Kemp Rd., Dayton 3, Ohio. The product is described as an electrically conductive composition of inorganic minerals which supplement the fluxing action of the welding rod coating. According to the manufacturer, the compound stabilizes and quiets the welding arc, prevents arc breakage, improves fusion, and prevents scale on both sides of the weld bead. It is said to prevent adhesion of weld spatter to parts being welded, thereby eliminating spatter-cleaning operations.

Pom, it is claimed, contains no oils or other combustible ingredients and therefore causes no smoke, fumes, or odors under the heat of the welding arc. Pom is a paste which can be thinned by the user with an equal part of water and brushed or sprayed into the seam to be

## PROTECT YOUR INVESTMENT IN CUTTING TOOLS



Make sure your machines use accurately ground tools to give you most profitable operation.

### The LeMaire 3-Wheel Grinder

provides the accurate means for obtaining and maintaining desired angles on cutting tools. Especially efficient for grinding Carbide-tipped tools. Two grinding wheels (rough and semi-finish) and a honing wheel run on sturdy, smooth-running spindles to produce the results you demand.

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**LeMaire Tool & Mfg. Co.**

2657 So. Telegraph Rd. Dearborn, Mich.

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-It Gear Chucks.

welded and on adjacent surfaces where spatter usually collects. After welding, all spatter and compound can be quickly wiped off with a dry cloth leaving a spotless weldment ready for painting, it is stated by the manufacturer.

Pom contains a rust inhibitor, thus enabling it to be applied to the steel at any time before welding, and is said to protect the parts from rust until they are fabricated. The compound is packaged in 1 and 5-gallon pails.

### Marvel Syncinal Filter

A sump type liquid filter which is adaptable for all types of oil recirculating machines, to be known as the Marvel Syncinal Filter, is now being manufactured by the Marvel Engineering Co., 69 W. Washington St., Chicago 2, Ill. According to the manufacturer, the filter is constructed entirely of non-rusting material, with all ferrous parts heavily cadmium plated or rust-proofed, and includes no moving parts subject to wear. The outstanding feature of the filter is its unusual design which provides for an unusually large filtering area, permits a low rate of flow, and requires a minimum of pressure. In addition, the Syn-

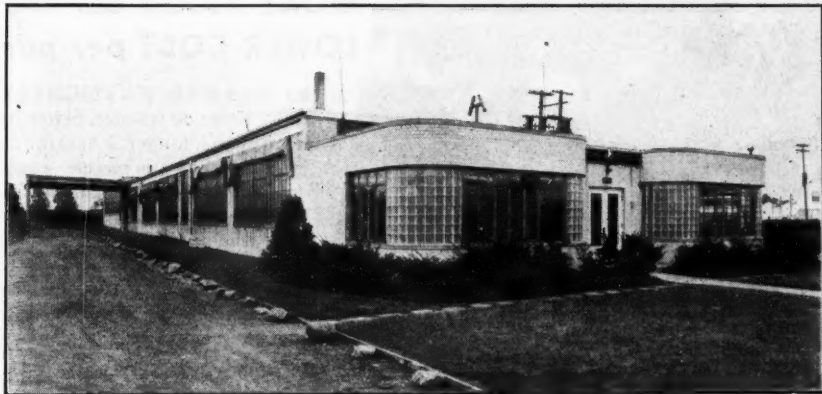


Marvel Syncinal Filter

clinal construction allows for easy cleaning of the filter since the large rounded filtering areas include no corners or crevices to collect waste material and build up restrictions.

The Marvel Syncinal Filter is standardly furnished with fine brass wire cloth which is rigidly reinforced and has openings of 0.0050 inch. Special filter in-

*The Home of fine tools, dies, jigs, fixtures and stampings . . . . .*



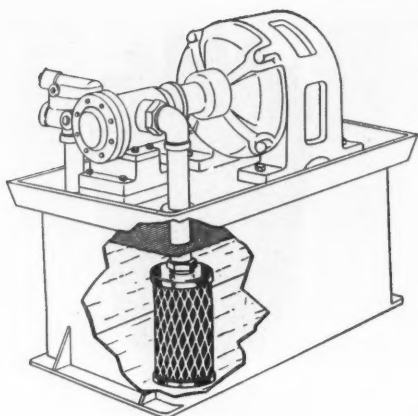
**THE H. & P. DIE & STAMPING COMPANY**

13945 Triskett

OR 8000

Cleveland 11, Ohio





Typical Installation of Marvel Synclinal Filter

serts with larger size openings, or smaller openings down to 0.0015 inch can be obtained. To reduce the danger of injury or collapsing of the filtering unit resulting from careless handling, an enclosing guard is provided for filtering unit.

Cleaning of the filter can be easily accomplished by unscrewing the coupling at the top of the unit from the line. The entire unit may then be removed and disassembled outside the tank. The special brass filtering unit is removable and can be easily cleaned with a brush or solvents, depending upon the material being filtered.

The Marvel Synclinal Filter can, it is claimed, be used with any liquids and all types of oils that are collected and recirculated such as in coolant systems, hydraulic systems, hydraulic machines, automatic screw machines, turret lathes, milling machines, boring mills, grinding machines, and so on. The filter is said to provide complete protection from wear to pumps, cutting tools, and cylinders of machines by collecting all metal cuttings, sand, and other abrasives.

### U. S. No. 1 Punch Press

Production of a punch press of 12-ton capacity for use in blanking, forming, perforating, drawing, and many other operations is announced by the U. S. Press & Tool Corp., 6456 N. Hamlin Ave., Chicago 45, Ill. Designated as the No. 1,

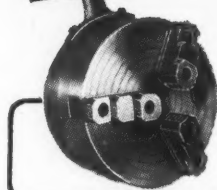


**If you want  
MORE PARTS per hour  
LOWER COST per part**

the BARKER WRENCHLESS CHUCK can do it faster, better and stand up to it longer. Where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine, these Chucks will increase production and pay for themselves in 60 to 90 days while

doing it. See how a Barker Wrenchless Two-Jaw or Three-Jaw Chuck can speed up production in YOUR plant.

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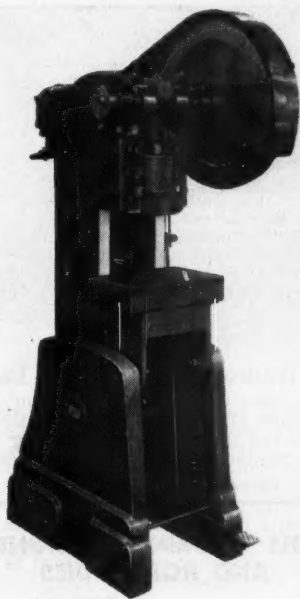
**— Chuck Division  
THOMAS HOIST CO.**

28 S. HOYNE

CHICAGO 12



the press features a modern streamline design; all-steel frame, fully stress relieved; bronze bushings at all wear points; sliding key clutch of tough alloy steel; jackscrew tilting mechanism; ample die space; ball and socket connection screw; webbed flywheel; floating



U. S. No. 1 Punch Press

motor mount for maintaining proper tension of the V-belt; standardization of parts for quick, easy interchangeability; and many other improvements.

According to the manufacturer, the features embodied in the U. S. No. 1 Punch Press are designed to greatly increase its general use and utility in a wide variety of plants and shops.

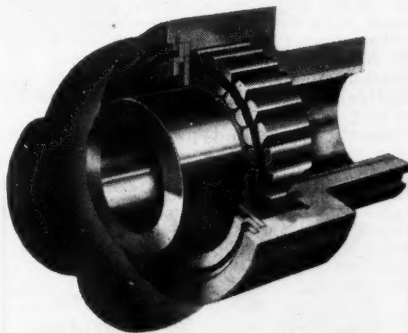
### Walnip Work Holder Clamp

An instantly adjustable work-holding clamp for use on jigs and fixtures, lathe faceplates, milling machines, grinders, shapers, planers, boring mills, drill and punch presses, and so on, is now being marketed under the trade name of Walnip by the Notcha Products & Sales Co., P. O. Box 2635, Paterson, N. J. Compact-ly and strongly made, the clamp is de-



## ABOUT FORMSPRAG

THE FULL COMPLEMENT  
*Over-Running Clutch*



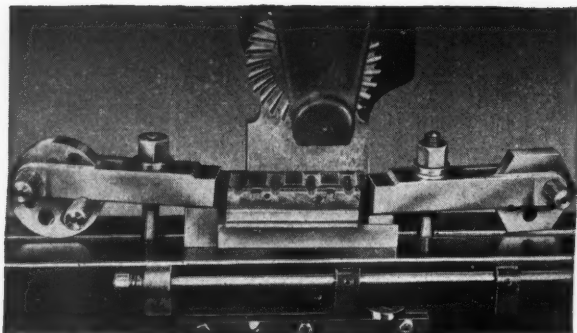
**F**RANKLY, we have been surprised to find there are so many different applications for Formsprag. We knew we had an outstanding product that would deliver high torque in a limited space, that would cut in and out hundreds of times a minute, that engaged positively and silently, that operated without backlash or vibration.

But we had no idea of the hundreds of different types of applications that Formsprag is now handling efficiently.

In manufacturing these many types it has been necessary to build Formsprag in many sizes and capacities, until we are now tooled up to produce a wide range of standard sizes, from 240 to 123,000 inch-pounds theoretical torque, in either plain or ball bearing types.

If you have, or think you may have an application, why not talk it over with us?

**FORMSPRAG**  
*Company*  
1415 JARVIS • FERNDALE, MICH.



**Walnip Work Holder Clamps  
in Use**

the adjustment is the same as with the round disc type-block and, except for the smaller number of positions obtainable, serves the same purposes. Any slight variation in the level of the work holder and the work to be held in place is compensated for by bevel washers. Both types of adjusting blocks are

signed for easy operation and is available with either a round disc or hexagon height position block, as desired.

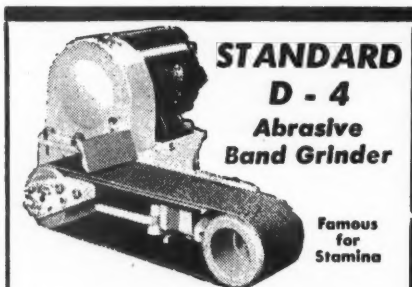
The Walnip Work Holder Clamp is produced in five sizes, each of which may be readily adjusted to a clamping position level with the work to be clamped. The round disc type of adjusting block has 50, 80, 108, or 128 clamping positions, depending upon the size. A minimum adjustment of 0.026 inch may be obtained in any position.

On the hexagon type adjusting block,

standardly made of steel and are equipped with steel bushings in all holes to prevent wear. If desired, bronze, brass, or aluminum round or hexagon adjusting blocks may be obtained.

### **GF Hydro-Copying Rigid Lathe**

The Cosa Corp., 405 Lexington Ave., New York 17, N. Y., announces the distribution of the GF Hydro-Copying Rigid Lathe produced by The George Fischer



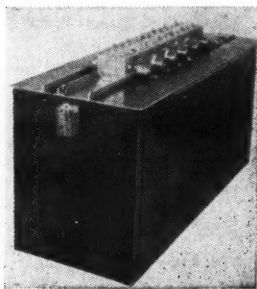
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 1/4" band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW  
MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**

306 E. 38th St., New York 16, N. Y.

### **ROLL FORMING MACHINES AND ROLLER DIES**



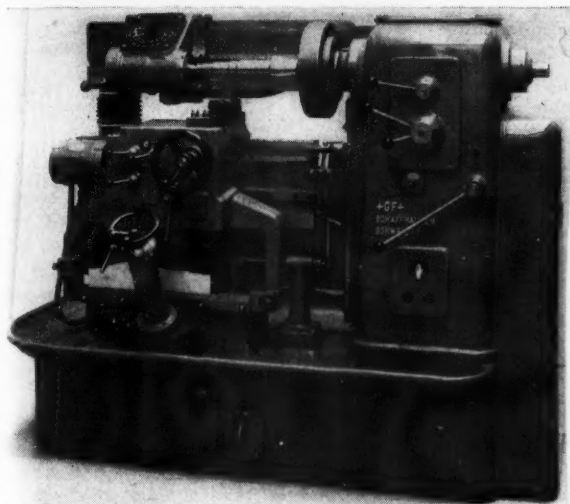
Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

**Maplewood Machinery Co.**

2634 Fullerton Ave.

Chicago, Illinois



**GF Hydro-Copying Rigid Lathe**

to a negative rake and is made from  $\frac{1}{4}$ -inch square stock. The cutting tool is clamped in such a manner that chatter is claimed to be completely eliminated even when taking cuts up to  $\frac{1}{4}$  inch with a feed of 300 feet per minute.

By means of templates, the lathe operates on the reproducing principle. The workpiece is held between centers at each end and is driven by self-centering claws. Several accessory tools for internal copying are available for the lathe.

Steel and Iron Works Limited of Schaffhausen, Switzerland. Specially suited to the problems of tungsten carbide tooling, the lathe resembles a milling machine in appearance. The tailstock and headstock are joined and braced by a massive overhead yoke. The tool-holding assembly rises from below the workpiece to bring the tool into contact from a point directly underneath the workpiece.

Rigidly constructed so as to permit maximum cutting speed, the GF Hydro-Copying Rigid Lathe incorporates a hydraulic copying system and affords vertical movement of the tool with the cutting edge to the rear so that the chips flow away from the operator. The template used is simple and economical to make and is exactly the same scale as the workpiece. The tool itself is ground

### **Lincoln Hardwell 50 and 100 A.C. Electrodes**

Two high-carbon electrodes for building up worn steel parts by welding with low-voltage a.c. transformers, as well as with d.c., are announced by the Lincoln Electric Co., Cleveland 1, Ohio. Designated as the Hardwell 50 A.C. and Hardwell 100 A.C., the electrodes, which have a heavily extruded shielded-arc-type coating, are said to produce flat, smooth beads which can be hot forged.

The Hardwell A.C. Electrode has a hardness of deposit on straight carbon steel when allowed to cool naturally of 20 to 45 Rockwell C, the exact hardness depending upon the rate of cooling and carbon content of the steel welded. The Hardwell 50 A.C. Electrode has a hardness of deposit on straight carbon steel

### **SAVE TIME with SOMERSET RADIUS DRESSER**

The Somerset Radius Dresser, widely used in shops throughout the country, presents many outstanding features. Wheel is dressed from below, avoiding removal of guard. Stop pins permit rotation thru 180° or 90° in either direction. New Wearover bearing is dust proof. Many other advantages.

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**SOMERSET TOOL CO.**

280 VIRGINIA ST.

HILLSIDE, N. J.



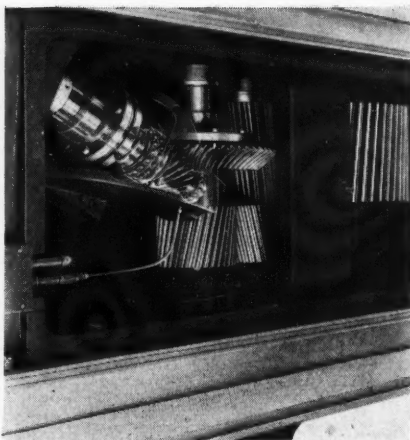
of 20 to 35 Rockwell C. Deposits may be further hardened by water quenching from approximately 1,500 deg. F. or by flame hardening.

For either a.c. or d.c., the Hardwell 100 A.C. Electrode is available in a  $\frac{1}{8}$ -inch size with range from 70 to 110;  $\frac{3}{16}$ -inch size with range from 105 to 170;  $\frac{1}{4}$ -inch size with range from 145 to 230; and  $\frac{5}{16}$ -inch size with range from 215 to 350. The primary color is brown and the secondary color is blue under the N.E.M.A. color code.

The Hardwell 50 A.C. Electrode is available in two sizes of  $\frac{3}{16}$  and  $\frac{1}{4}$ -inch with the same current range for each size as the Hardwell 100 A.C.

### Gray Space-Saver Drive

A space-saver drive for both double housing and openside planers is announced by The G. A. Gray Co., Department C, Cincinnati, Ohio. As the name implies, the drive provides for floor space conservation by enabling the driving motor to be placed behind the column or housing and close to the planer bed. This location of the motor also protects it from the dust and grit produced by the cutting



Gray Space-Saver Drive

tools and thus reduces the need for motor maintenance.

In addition, few gears, shafts, and bearings are required to transmit the power. The hardened and lapped hypoid

## LEIMAN BROS. ROTARY VACUUM PUMPS

Air from cylinder through by-pass in cylinder head enters this slot on its way to the outlet above. No opening in curved inner surface of cylinder means quiet operation.

Each end stud in piston holds wing close to cylinder at top, preventing loss of air pressure.

Air coming in at inlet at side comes through this slot into cylinder head by-pass and thence into the cylinder. No opening in curved inner surface of cylinder means quiet operation.

INLET threaded for standard iron pipe.

OUTLET threaded for standard iron pipe.

Direction of rotation showing how extended wing scoops up the air admitted at inlet, each revolution carrying it around to the outlet.

The easy action hinge enables wing to open and close, thus becoming wear compensating by the action of centrifugal force.

Wing and cylinder surface become hard and glassy-like, insuring a perfect fit and positive pressure or vacuum. No composition tips to require renewal frequently.

Noiseless • Powerful  
Efficient

THEY TAKE UP THEIR OWN WEAR

Machine Designers Secure  
Good Results When They  
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Industry

Made in many sizes to fit any purpose or any dimensions—used in all industries for picking up and carrying sheets of paper, cardboard, tin or other materials; handling liquids by vacuum or pressure as in bottle filling operations; also for agitating solutions; aerating water as in fish aquariums and elsewhere. They operate vacuum printing frames; vacuum canning machines, cooling linotype machine molds, gas and oil burning appliances, furnaces, blowpipes, etc., used in hospitals for etherizing, vacuum treatments, wound cleaning in operations; all sorts of operations in filling bags, cartons, collapsible tubes, and containers of all sorts; for creating instant and high heat in steam radiators; for vacuum holding chucks and for hundreds of other uses.

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BULLETIN

# LEIMAN BROS.

168 CHRISTIE ST.  
NEWARK 5, N. J.

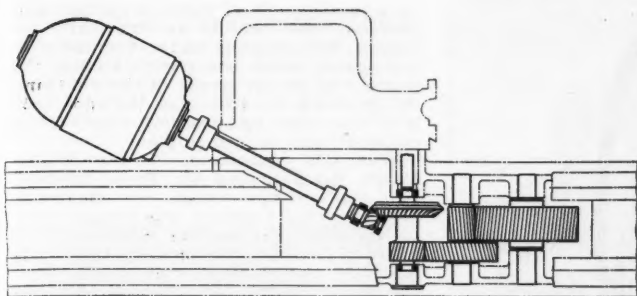


Diagram Illustrating Application of Gray Space-Saver Drive to Planer

eliminates vibration and noise due to misalignment of the motor, even if considerable misalignment exists. It is also said to eliminate strain and wear on the bearings.

gears, in combination with the helical gears and table rack, afford maximum load carrying capacity with enduring smoothness of motion. The hypoid pinion, as shown, is rigidly mounted between anti-friction bearings.

The motor drives the simplified gear train through a large diameter, tubular "floating shaft" having flexible connections at both ends very similar to the propeller shaft of an automobile. These flexible connections are said to have no backlash and to require no lubrication or other attention. According to the manufacturer, the floating-shaft construction

### Winter Model RR-2 Spring-Air Press

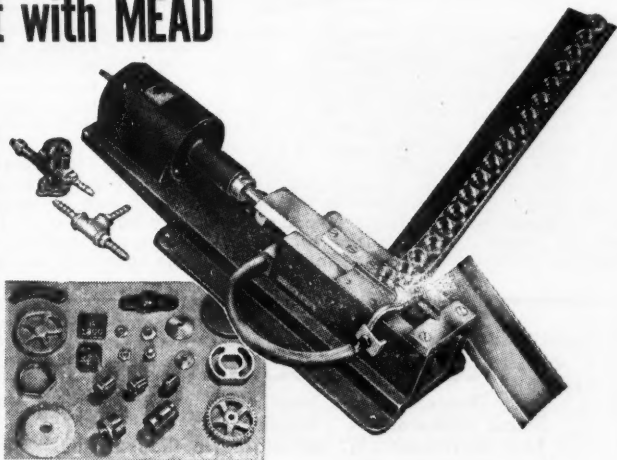
Designated as the Winter Model RR-2 Spring-Air Press, a lightweight punch press designed for use in performing light staking, riveting, forming, bending, stamping, punching, and other operations within the normal range of the standard foot or kick press is now being marketed by J. L. Lucas & Son, Inc., Bridgeport 5, Conn. Motive power is furnished by a fast-acting air cylinder, and the actual force of the blow is derived from a spring which is compressed before

## Boost Output with MEAD WORK FEEDERS

**Feed Work Fast to Drill or Tap!**

As-fast-as-you-can-step-on-a-button the sensational new Mead pneumatic WORK FEEDER delivers, holds, ejects small parts to be drilled, reamed or tapped. Accommodates stampings, castings, screw machine parts, etc. Adjustable to sizes up to 3". Foot or automatic control; operator's left hand is free to keep hopper loaded.

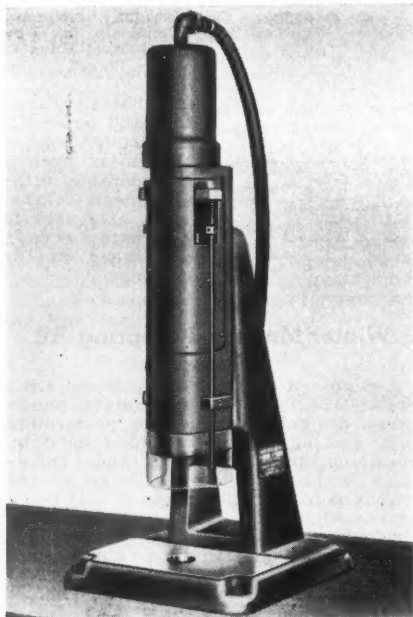
Write for new Mead AIR POWER Catalog describing "Mead Family" of air operated fixtures and devices.



## Mead Specialties Company

4114 NORTH KNOX AVE., Dept. AA-47, CHICAGO 41, ILL.





Winter Model RR-2 Spring-Air Press

release by the action of the air cylinder. Safety, lack of operator fatigue, speed, and uniformity of the power delivered by the blow are claimed to be afforded by the press, the throat of which is adjustable for height from  $3\frac{3}{4}$  to  $8\frac{3}{4}$  inches. The strength of the blow may be adjusted to any desired value.

During operation, energy from the downstroke of the cylinder is stored up by compressing the actuating spring that presses directly on the ram which is located in place by the release mechanism.

At a predetermined value of spring compression, the ram is automatically released, accelerating under the force of the spring until the punch strikes the work. The return stroke of the air cylinder provides for lifting of the ram back into the starting position where it is automatically locked in place.

Standard equipment of the Winter Model RR-2 Spring-Air Press includes two coil springs which, for maximum blow, are used together, one nesting within the other. The heavier spring is rated at 80 p.s.i. and the smaller one at 30 p.s.i. the maximum blow obtainable from the heavy spring is approximately 2,500 lb. through a working distance of  $\frac{1}{8}$  inch at the bottom of the stroke. The strength of the blow is adjustable from a maximum down to a light tap.

The standard release of the Model RR-2 is a safety type which requires the use of both hands of the operator simultaneously so that the press cannot be actuated accidentally while one hand of the operator is beneath the ram. If the safety release is not required, a standard single foot pedal release can be furnished, a plastic automatic guard being standard equipment on all foot-operated presses.

The Winter Model RR-2 Spring-Air Press is constructed of three aluminum castings which form a rigid frame, adjustable in height. The power unit is one compact assembly, which, for special applications, may be removed from the surrounding castings and mounted in a horizontal position.

The ram is hardened and ground, fitting the bored and reamed bearing with a maximum clearance of 0.002 inch. All moving parts of the press are fully hardened, and the compression springs are designed to adequately withstand the type of action required by the machine, which can be satisfactorily operated on any line pressure from 60 to 120 lb., with pressures higher than 60 lb. increasing the speed of the complete machine cycle.

## TOOL MAKERS SELF LOCKING BORING CHUCK

Body Diameter— $1\frac{1}{2}$ " ; length  $1\frac{3}{4}$ "

Shank Diameter— $\frac{1}{2}$ " ; length  $1\frac{1}{2}$ "

Tool Movement— $\frac{3}{8}$ " adjustable in thousandths

Tool Diameter— $\frac{3}{8}$ "

Hardened and tempered screw, tool block and shank.

SPECIAL SHANKS AVAILABLE.

F.O.B. Manchester

**SMITH BORING CHUCK CO.**

Box 69

Manchester, Connecticut





## "Easy-Tote" Departmental Truck

Designed to reduce manual effort to a minimum in the handling of tote pans, a departmental truck, to be known as "Easy-Tote," has been announced by Easy-Tote Products, Inc., Arcade, N. Y. The design includes a crank, hook, rigid handle, and tilting low base plate which enables a worker to load, roll, and unload

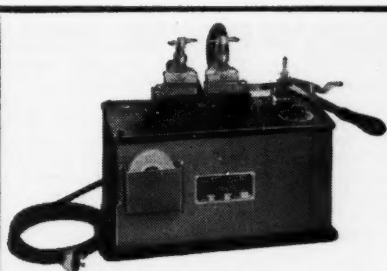


"Easy-Tote" Departmental Truck

the truck quickly and easily. In addition to tote pans, the flat, low base plate is designed to accommodate containers and other receptacles.

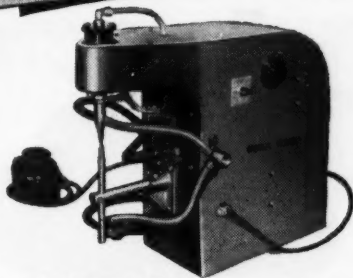
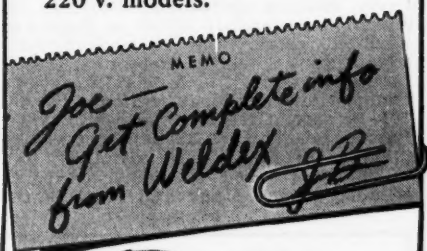
To facilitate moving of the loaded truck from one location to another, the Easy-Tote is provided with two roller bearing-equipped side wheels and full swiveling caster with anti-friction bearings. Loads are said to be carried equally by the three wheels, the operation of which is claimed to be unaffected by uneven floors and small obstacles. The balance between the three separate wheels is said to practically eliminate possibility of load spillage.

The base plate of the Easy-Tote consists of a  $\frac{3}{8}$ -inch thick steel plate measuring 16 x 22 inches in size, which is said to be adequate for accommodating tote pans of all standard sizes. The base plate is located 2 inches from the floor. The pair of 3-inch diameter roller bearing wheels are located on a heavy axle weld-



## FLASH Bandsaw Welder

Beats brazing and butt-welding. Cuts set-up costs. Welds, forges and anneals up to  $\frac{3}{4}$ ". 6-Point heat controls. 110 and 220 v. models.



## COMPACT Spotwelder

Engineered for light gauge production spot welding. 3 KVA, capacity 18 gauge. Air operated, electronically timed, water-cooled. Only 21" high.

# Weldex Inc.

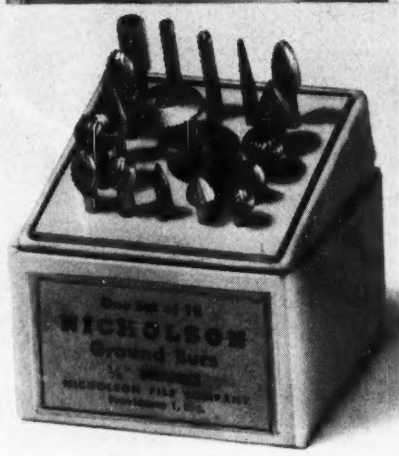
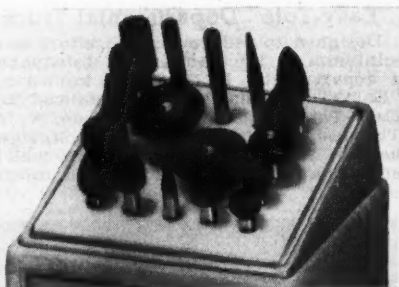
7327 McDONALD DETROIT 10, MICH.

ed to the base plate and are designed to support a 600-lb. load with a generous safety factor. The ball bearing caster with roller bearing wheel located at the rear of the base plate permits the truck to turn in its own length, thus providing for maximum maneuverability. Small fenders are located over each of the side wheels to guide the boxes as they are loaded onto the track, and to eliminate wheel interference when the truck is moving.

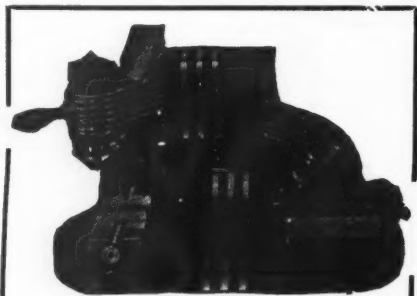
### Nicholson 1/8-Inch Shank Rotary Files and Ground Burs

The Nicholson File Co., Providence 1, R. I., announces a line of rotary files and ground burs with 1/8-inch shanks for relatively delicate operations. The line includes nine standard styles or shapes of hand-cut rotary files or ground-from-solid burs. Stock diameters of heads range from 1/8 to 5/8 inch. Shanks are code stamped for easy identification.

As a special feature, the company offers assortments of 18 hand-cut rotary files or 18 ground burs packaged in a cellophane covered box which serves as a handy bench stand and protects the



(Above) Nicholson 1/8-Inch Shank Rotary Files.  
(Below) Nicholson 1/8-Inch Shank Ground Burs



### ACCURATE ENGRAVING with Unskilled Operators

Engraves an area 4 by 4 inches. Will engrave curved surfaces without special templates. It engraves smooth lines in any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steel and all plastics. . . . Drills a series of holes, or profiles small parts. . . . Cuts an even channel for wiring on panels. . . . Increases accuracy and production. . . . Works from original drawing or templates. . . . Etches glass and similar items. . . . Will not cause distortion. For information and prices write Dept. M.

**AUTO-ENGRAVER COMPANY**  
1776 Broadway, New York, N. Y.

tools when not in use. The files and burs can be used with portable hand tools (air or electric), drill presses, or flexible shaft equipment at speeds up to twice those recommended for the company's 1/4-inch shank tools. Speeds are dependent on the actual diameter of the head section.

Nicholson 1/8-Inch Shank Rotary Files and Ground Burs are particularly recommended for use in tool, die, pattern jewelry, dental, and optical shops.

### "Veritron" Electronic Pyrometric Controller

Featuring an unusually compact design and simplified operation, an electronic pyrometric controller specially suited for direct installation on industrial furnaces and plastic molding ma-

chines, to be known as the "Veritron," is announced by the Taco West Corp., 2620 S. Park Ave., Chicago, Illinois.

In operation, the control pointer is set at the desired temperature and control is said to be immediately established with an unusually narrow temperature range. The design permits the instrument movement to operate a heavy duty relay system without any physical contact or reaction effect on the indicating pointer. The relay is built-in and has a load capacity of 3 kw. non-inductive. The electronic circuit is claimed to require no tuning or other adjustments by the user at any time.

According to the manufacturer, the electronic control mechanism is absolutely stable and is unaffected by line voltage variation, surge effects, tube aging, or component changes. A pointer movement upon the scale of 0.002 inch is said to produce exacting relay operation.

The measuring system is claimed to be unusually well compensated for cold junction deviation, moving coil temperature coefficient, and magnetic errors. All vital components of the measuring system are rigidly fastened to ensure a mechanical alignment undisturbed by stresses and strains due to vibration, shock, or ambient effects.



"Veritron" Electronic Pyrometric Controller

The measuring system and electronic mechanism are separately housed in sealed units that are designed for plugging into the instrument case. The complete instrument measures  $7\frac{1}{2} \times 5\frac{1}{2} \times 5\frac{1}{2}$  inches and may be either flush or surface mounted. A full 5-inch mirrored combination scale is furnished as standard equipment.



**LIBERT MACHINE CO.**  
**GREEN BAY • WISCONSIN**

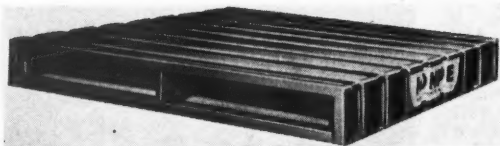
**for BETTER  
PRODUCTION and  
MAINTENANCE**  
*at lower cost*

A proved time-saver in any sized shop. Libert's *flexibility* gives you a wider variety of work—clean shearing of flat or formed sheet metal...straight or irregular shapes...inside or outside cuts. Libert *simplicity* means that even unskilled labor soon does accurate work, lots of it *and fast!*

Write for bulletin.

Made in sizes up to 60 in. throat, 10 gauge capacity

**Libert Hi-Speed SHEAR**



Monroe All-Steel Pallet

### Monroe All-Steel Pallet

The addition of an all-steel pallet to its line of production-tested material handling equipment is announced by the Monroe Auto Equipment Co., Monroe, Mich. Manufactured of high tensile steel, the pallet is said to be 40 per cent less in weight than units of comparable size formerly made of hot rolled steel. For example, a 48 x 48-inch size pallet is claimed to weigh 46 lb. less than its hot rolled steel predecessor.

In addition to the savings in weight, the Monroe All-Steel Pallet is standardized in size to fit into railroad and truck equipment as well as storage facilities built for modern material handling truck operations. The pallet is available in three sizes to meet the shipping requirements of modern packages, most of which have at least one dimension of 12, 24, or 48 inches to provide for easy

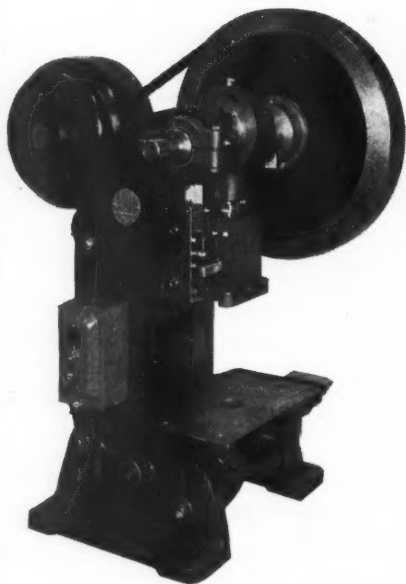
and compact pallet loading.

The Monroe All-Steel Pallet is designed for use with standard fork trucks or hand and power-operated pallet trucks. When tiered, the pallet is said to have load-bearing capacities of more than 100,000 pounds.

### Electric Salt Bath Furnace Employs Oxides to Automatically Renew Electrodes

What is said to be one of the most revolutionary advances in the design and construction of internally heated salt bath furnaces is contained in the announcement of the new means of automatically renewing electrodes which have been permanently sealed in among the refractory matter at the bottom of an electric salt bath furnace.

The new process, which was developed by the Upton Electric Furnace Div., 7450



## “Hub”

### POWER PRESSES

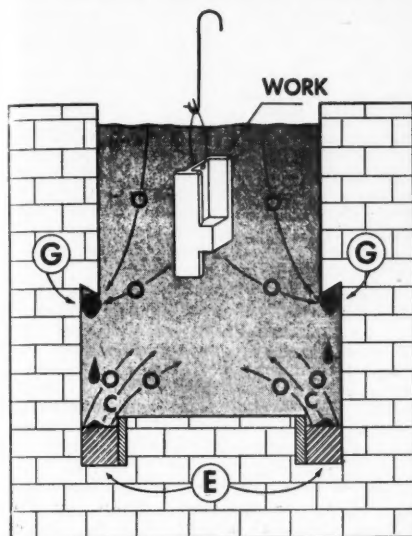
MODERN POWER PRESSES,  
COMPLETELY **MOTORIZED**  
FOR IMMEDIATE DELIVERY.

Presses are Available in floor or bench models — capacities are 4½, 6, 15, and 27 ton sizes.

**INQUIRE ABOUT THE  
NEW 27 TON MODEL**

**Wm. Brewer Mach. Co.**  
75 Laurel Street  
Hartford • Conn.

Melville at Green, Detroit, Michigan makes use of the natural chemistry of a high temperature salt bath furnace to cause the electrodes, which are normally wasted away during high temperature



O OXIDE      E ELECTRODE  
C CARBON    G GRAPHITE ROD

Drawing indicates how oxides which form in the bath from three sources (contact with atmosphere at the surface, from the work itself and from the electrodes) are employed to self-perpetuate the electrodes. In giving up oxygen, electrodes waste away. Oxides circulating through bath contact graphite rod and are reduced to metallic scale. As carbon content increases, the melting point of scale is decreased. Scale forms in droplets and falls on and becomes integral part of electrode when carbon content of droplet is reduced.

heat treating, to renew or "self-perpetuate" themselves.

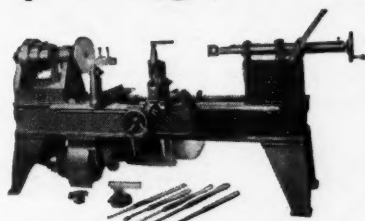
Source of the renewing agent, according to the company, is the presence of oxides which are normal to any high temperature salt bath. These oxides are automatically generated from three sources; namely, contact of the molten salt (at temperatures of upwards of 200 deg. F.) with oxygen of the atmosphere. the absorption of oxygen from the surface of the work and the absorption of oxygen from the surface of electrodes.



Engineered construction gives performance far beyond rated load. Complete range of sizes. Ask your distributor or write for catalog "C."

 **The BRADFORD**  
MACHINE TOOL CO.  
Established 1860 CINCINNATI, OHIO

## "OLIVER" Spinning Lathes



Smoothly spin all metals including sheet steel. Headstock spindle has taper roller bearings with large thrust capacity. Ball bearing live tail center. Made in 12, 16, 20, 24 and 30 inch diameter swing over bed; with plain bed or carriage.

Write for Complete Details

**OLIVER MACHINERY COMPANY**  
Grand Rapids 2, Michigan



The absorption of the oxygen from the electrodes is the most serious result of the generation of oxides within a salt bath since this causes a wasting of the electrodes.

To avoid such deterioration, which is said to be quite rapid when the electrodes are inserted into the bath from above the surface, the Upton designs long ago sealed the electrodes into the bottom of the furnace so as to seal off the atmosphere and its resulting attack.

While this greatly increased the life of the electrodes so that they would give years instead of months of service, it does not eliminate deterioration entirely. Now, however, this has been accomplished, and by a very simple expedient.

The electrodes—there are usually two in the average high heat furnace—are located in a slot or pocket in the bottom of the furnace. On each side of the pot and immediately above each electrode there is a ledge or overhang of refractory material that is slightly wider than a graphite rod. The graphite rod, being of considerably lower specific gravity than the salt, is thus held against the under side of the ledge by its buoyancy once it is placed in position.

The chemical action that takes place as a result of this arrangement when the

bath is in operation is entirely automatic. As the oxides contact the graphite rod, they are reduced to a metallic state and since their melting point is higher than that of the bath, they form a metallic scale on the graphite rod. However, the contact with the carbon rod increases the carbon content of this metallic scale and reduces its melting point until the scale melts and drops from the rod. Since the rod is immediately above the electrode, the metal falls on the electrode.

Here, out of contact with the carbon of the rod, the oxides in the bath will reduce its carbon content until it becomes a solid, integral part of the electrode itself. This process continues automatically until the carbon rod has been consumed, when a new rod can be inserted under the ledge.

In some heat treating operations, this automatic renewal of the electrodes may not be fast enough because of the type of work being treated or because the graphite rod may not be used. In these instances an "auxiliary" and very rapid means of replenishing the electrodes exists, which consists of simply dropping some cast iron into the bath.

Since the cast iron is of lower temperature than the bath, it will melt and run over into the slot. Then, by the simple chemical action outlined above, the oxides reduce its carbon contents so that it becomes an integral part of the electrode. Thus, by either means, the electrodes never need changing and they will, in fact, outlast the furnace itself.

Additional advantages claimed for the use of the graphite rod is that it reduces the tendency for decarbonization of the work being treated thereby producing work that constitutes a tremendous step towards metallurgical perfection and that it also keeps the bath quiet and completely neutral.

### "Flux-Stik" Soldering Flux

Designed to provide for maximum convenience and economy in use, a soldering flux molded into clean, easy-to-use stick form is now being offered under the trade name of "Flux-Stik" by the Lake Chemical Co., 607 N. Western Ave., Chicago 12, Ill. According to the manufacturer, the flux is non-acid yet thoroughly and quickly dissolves the oxides of metals and thus prepares a free, clean surface for the solder to alloy itself firmly to the metal. With the flux, cleaning of the metal is said to be unnecessary.

Non-running, Flux-Stik is designed to



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EQUIPMENT**  
*must have*  
**PRECISION  
GEARS**



**Abart  
GEARS**

Abart, long supplier of gears for electrical industry, knows the particular gear requirements. Every Abart gear is made to fit the conditions of use as to design, material, cutting and finish. Spur, bevel, worm, worm wheels, spirals, internal—all to your specifications. Prompt delivery. Send B/P for quotation.

**Abart**

**GEAR & MACHINE CO.**

4819 W. 16TH STREET

CHICAGO, ILL.





"Flux-Stik" Soldering Flux

cover only the immediate vicinity of the soldering joint when heat is applied and does not spread itself all over the surface of the metal, thus keeping the latter clean and free both from wasted fluxing

material and solder, it is claimed. Flux-Stik can be applied equally well to either hot or cold metal and is made so as to permit the solder to flow easily and smoothly and to adhere firmly and thoroughly to the metal. The flux is claimed to be ideal for overhead, inaccessible, and out-of-the-way soldering locations where cleaning of the metal is difficult, and can be used for sweat joints of copper or brass tubing, manifolds, traps, elbows, piping, sheet metal, cabinet work, refrigeration and heating coils, and so on.

### Acromark Series 9A Marking Machine

Marketed by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J., the Acromark Series 9A Marking Machine illustrated herewith is designed to mark the turned surface between hexagon nuts on brass, copper, iron, and steel couplings. Adjustments for marking various sizes of couplings are provided.

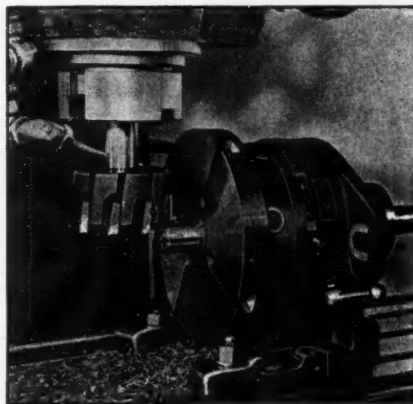
The design of the Acromark Series 9A Marking Machine includes a fixture which is arranged to roll the coupling or other part to be marked as the marking die passes over it. The fixture has an ad-

## The Hartford "SUPER-SPACER" for MILLING GRINDING JIG BORING SLOTING

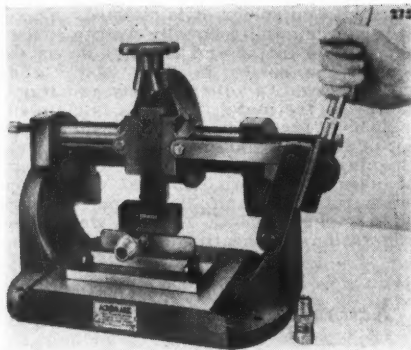
The HARTFORD "Super-Spacer" has proved its wide possibilities to many users.

Assures accurate machining operations and rigid control on your milling, drilling, grinding, slotting and jig boring. It is simple, compact and rugged in design, operates at speeds and feeds limited only by the capacity of the machine.

Write for Complete Data



**THE HARTFORD  
SPECIAL MACHINERY CO.  
HARTFORD 5, CONN.**



Acromark Series 9A Marking Machine

justable back plate stop which also acts as a straightedge, and the center block of the fixture supports the turned surface of the coupling or part as it is rolled. At each end of the adjustment plate is an ear with elongated hole, thus permitting adjustment for coupling sizes by loosening two Allen set screws.

The machine is sturdily constructed to provide for maximum rigidity, and all

moving parts are arranged so as to reduce friction wear to a minimum.

### Airco No. 375 Electrode

Designated as the Airco No. 375, an electrode for producing machinable welds on cast iron has been announced by the Airco Export Corp., 33 W. 42nd St., New York 18, N. Y. The electrode, which consists of a high nickel core wire and a heavy extruded coating, is said to be of special use in the automotive field for production line repair work, as well as for use on all castings requiring machinable welds.

As a result of its high nickel content, the Airco No. 375 flows unusually well and the resultant deposit is sound, the manufacturer states. The weld and fusion zone is described as soft and easy to machine. In addition, the electrode is said to withstand hydrostatic pressure and may be used with ease in a down-hand, vertical, or overhead position. Multiple pass welds can be made without danger of cracking, it is claimed.

The Airco No. 375 Electrode may be used on either a.c. or d.c. and is available in  $\frac{3}{8}$  and  $\frac{1}{2}$ -inch diameters.

**CHAMFERED CORNERS**  
for locating the base

**HOGGSON BRAND**  
HAND CUT  
STEEL STAMPS

Also Made In  
**REVERSE**  
for  
MOLDS AND  
DIES

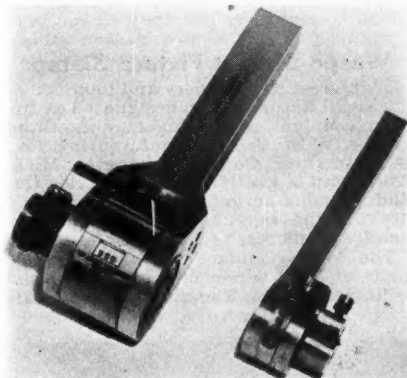
**Long Service**  
**CLEAN IMPRESSIONS**

Deep, hand-cut letters in special-formula steel that is the result of 90 years of die making; faces angled for added strength. For parts identification, tool marking, numbering. Available through mill supply houses.

**HOGGSON & PETTIS MFG. CO., New Haven 7, Conn.**

## New Method Automatic Roll Marker

Designed for use in lathes, shapers, automatic screw machines, and similar machine tools, an automatic roll marker for imprinting letters, numbers, calibration lines, serrations, and so on, on finish-machined parts is now available from



New Method Automatic Roll Marker

New Method Steel Stamps, Inc., 149 Jos. Campau St., Detroit 7, Mich. Construction features of the marker include pre-lubricated sealed-in ball bearings for the roller die shaft.

An outstanding advantage of the New Method Automatic Roll Marker is the fact that it can be used interchangeably for right or left-hand operation. With the change-over arrangement, the adjustable stop, stop dog, and fully enclosed automatic spring return can be shifted as an assembly from one side of the marker to the other to suit the position in relation to spindle rotation. The marker is also equipped with a device for adjusting the tension of the automatic spring return for the roll.

The use of ball bearings is said to enable maximum pressure to be exerted by the marker on the work. The sealing arrangement for the bearings protects them against scoring due to small chips carried by the cutting lubricant.

The New Method Automatic Roll Marker is available with a roll of either the solid or interchangeable type. The tool is standardized as to general design, the shank being constructed for mounting in conventional holders, but custom made to meet specific dimensional requirements where necessary.



## PORTABLE PUMP UNITS

*Use these compact  
self-contained units as*

**Coolant Systems** for all types of Machine Tools.

**Stand-by Pump Units** in case your built-in pumps fail.

**Automatic Die or Stock Lubricators** on punch presses.

*(Ideal for coil stock)*

For hundreds of special applications—circulating or applying liquids of many kinds.

### GEAR and CENTRIFUGAL PUMPS

**Volume to 43 GPM—Pressures to 50 PSI**

**5- 12- 38-GALLON CONTAINERS**



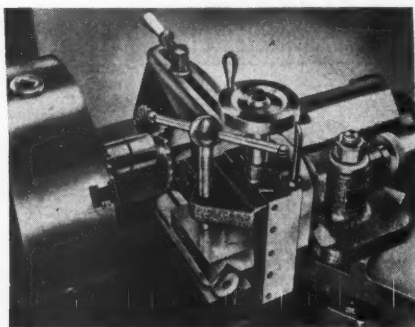
**See your Industrial Distributor  
or send for Catalog to...**

## GRAY-MILLS CORPORATION

**1959 RIDGE AVENUE  
EVANSTON, ILLINOIS**

## K-J Milling Attachment

A milling attachment which can be quickly mounted on any engine lathe, thereby enabling the operator to perform



K-J Milling Attachment Installed on a Lathe

a wide variety of light milling jobs such as milling keyways, flats, and small shafts, is now being offered by the Kyle-Johnson Machine Co., Dept. MMS, 1627 W. Pico Blvd., Los Angeles 15, Calif. Designated as the K-J, the attachment can be used as a drilling vise if desired.

Of all-steel construction, the K-J Milling Attachment is graduated in thousandths of an inch and has a vertical travel of 6 inches. The jaw opening is 2½ inches. According to the manufacturer, the attachment is sufficiently flexible to permit angle milling and may be tilted as desired by the operator.

## Gulf Soluble Cutting Oil

Said to combine, together with all-water miscibility, the qualities of high lubricating value, extreme stability,

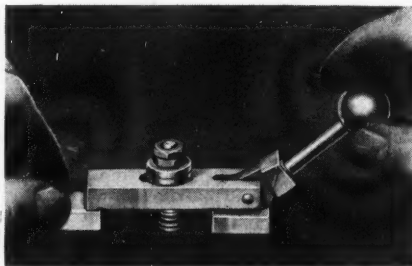
pleasant odor, non-foaming and rust-preventive characteristics, a cutting fluid to be known as Gulf Soluble Cutting Oil is announced by the Gulf Oil Corp., Pittsburgh, Pennsylvania.

According to the manufacturer, use of the oil provides for improved production together with increased tool life, and reduces down time for tool changes to a minimum.

## Wespo Midget Fixture Clamp


Of interest to designers and toolmakers is a small fixture clamp designated as the Wespo Midget now being manufactured by the West Point Manufacturing Co., 19625 Merriman Court, Farmington, Mich. The clamp is available in four styles (including quick-action types) of very small size for the easy holding of extremely small workpieces.

The Wespo Midget Fixture Clamp is made of steel which is heat treated and cadmium plated. The clamp strap is 2½



Wespo Midget Fixture Clamp

x ⅝ x ⅜ inch in size, and spherical washers with ground radii to compensate for irregularities in the work are provided.



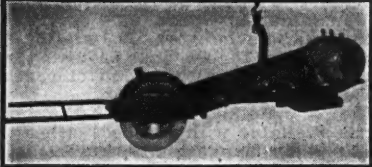
**GRAY TURRET HEAD METAL CUTTER OR NIBBLER**

**N.A.M.** Pioneer Award  
Given to Gray

Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

**GRAY MACHINE CO.**  
Box 596, Philadelphia, Pa.

**MUMMERT-DIXON SWING FRAME GRINDERS**



Sizes 12", 14", 16", 18", 20" and 24" wheels.  
Ask for Descriptive Circular  
**MUMMERT-DIXON CO.**  
120 Philadelphia St. • Hanover, Pa.

## Rubbermatic Concrete Floor Paint

Made of 100 per cent gilsonite, Rubbermatic Concrete Floor Paint, announced by the Tiz-Nu Corp., 673 Coronado St., Los Angeles 5, Calif., is said to dry tack free in four hours to a smooth, enamel-like finish.

Available in various colors, the paint, according to the manufacturer, eliminates the necessity of etching or priming, as well as saponification difficulties, and is 100 per cent waterproof. Flushing a floor with water after the paint is dry produces a flint-like finish which resists acids, alkalis, heat, electrolysis, rain, sun, snow, ice, and the abrasive effects of dirt and sand it is claimed.

## du Mont "Minute Man" Keyway Broach Kit

The du Mont Corp., Greenfield, Mass., announces a keyway broach kit, known as the "Minute Man," for use in the hand cutting of keyways of any standard width and any depth in gears, milling cutters, pulley hubs, collars, couplings, and other parts requiring keyways.



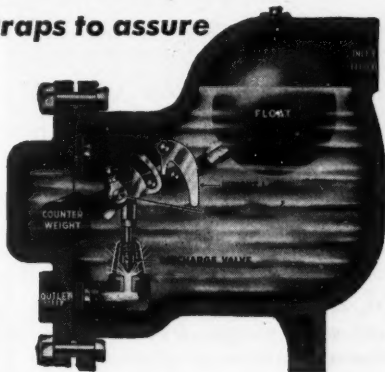
du Mont "Minute Man" Keyway Broach Kit

Used with a hand-operated arbor press, the proper size bushing for any given bore is selected from the kit and dropped into the bore. The broach of the desired width is then inserted in a slot provided in the bushing and pressed through with the arbor press, using shims (also provided in the kit) and a second pass in order to obtain the exact keyway depth desired. The entire operation is said to require no more than a minute.

**Nicholson LEAK-PROOFS traps to assure**

## CLEAN AIR WITHOUT loss of pressure

A POSITIVE FLUID SEAL is a feature of all Nicholson air traps, eliminating troublesome loss of medium in discharge. OTHER FEATURES—Instantaneous action due to weight operation . . . Hardened stainless steel where it counts. Put a Nicholson air trap on a line and test their dependable protection against blemishing of parts and jamming of tools.



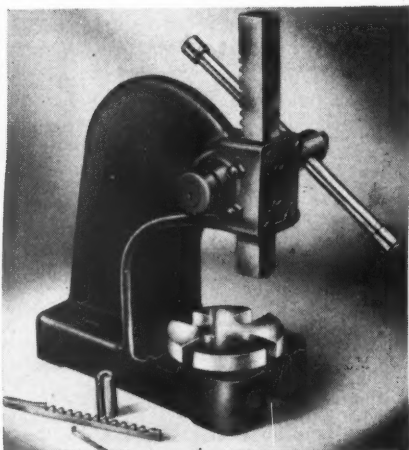
Nicholson Traps for Every Purpose: weight-operated, pressures to 1500 lbs.; piston-operated, thermostatic and expansion, for medium pressures.

**Catalog 444 or See Sweet's**

136 Oregon St., Wilkes-Barre, Pa.

**W. H. NICHOLSON & CO.,**





du Mont Arbor Press

Broaches, bushings, shims, and key-way stock are all provided in the kit. The company also has available a lightweight, strongly constructed arbor press for key-way broaching, and other shop uses.

*Noblewest Automatic*  
**NUMBERING HEADS**



Fast, accurate, dependable. Made of the finest grades of steel. Will number consecutively or constant as desired. Used on round or flat surfaces. Write for complete details.

**MARK IT BEST WITH NOBLEWEST**

**Noble and Westbrook Manufacturing Co.**  
25 Westbrook St., East Hartford 8, Conn.

NOBLEWEST  
APPROVED  
MACHINE  
TESTED

## Airco Automatic Electrodes

Supplementing the well-known Airco brand of manual electrodes, the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y., is now introducing a group of automatic arc welding wires and tapes. The line embraces five knurled type wires and five tapes, all for flat-position operation and all highly recommended for uniform, automatic welding. Their applications on the production line range from thin gauge sheet metal forms to boilers, axel housings, and torque tubes.

Airco Automatic Wires and Tapes are manufactured in several diameters and are designed to meet the general requirements of high speed production welding. The wires may be used separately or in conjunction with the tapes, depending upon the job to be performed.

## Luma Improved Electric Soldering Tool

Fine dental soldering with pin point precision is said to be possible with the Luma Improved Electric Soldering Tool illustrated herewith, product of the

## Whitney-Woodruff TYPE KEYS

**Lower Production Costs and Provide Greater Ease of Assembly**



### Check These Advantages

- ✓ Eliminate skilled labor in key-seat cutting and key-fitting operations.
  - ✓ Flat key bottom and starting radius on the edges simplify assembly.
  - ✓ Key reaches deep into shaft and is firmly imbedded, enabling it to withstand greater strain.
  - ✓ Greater resistance to shaft fracture due to shape of key seat and permanent key fit.
- Made in American standard sizes and Whitney standard sizes for special application.
- Available from Whitney Distributors throughout the country. Or write:

**WHITNEY CHAIN & MFG. CO.**  
HARTFORD 2, CONN.



## Luma Improved Electric Soldering Tool

Luma Electric Equipment Co., P. O. Box 132, Toledo 1, Ohio. According to the manufacturer, low and high fusing golds and high fusing chrome alloys can be readily electronically soldered in a minimum of time with the tool. The unions that result are said to be unusually strong, with bulk practically eliminated. Moreover, little or no waste of fusing materials is experienced after unions are completed, it is claimed.

The fine dental soldering possible with the Luma Improved Soldering Tool is due to instant high heat and the fact that current is localized at the contact point. The heat can be raised or lowered to meet the demand of the fusing materials and the union to be made through a six-stage selector in the soldering tool.

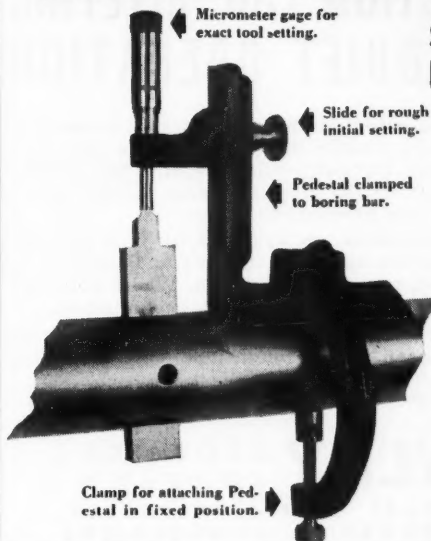


## "Di-Acro" Radius Brake

Quickly adjustable for forming chrome molybdenum and other low ductile alloys to the radii necessary to prevent fracture of the material, the "Di-Acro" Radius Brake illustrated herewith is now being produced by the O'Neill-Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. According to the manufacturer, the radii obtainable with the unit are ir

# BARTELT GAGES SAVE TIME

## SHORTEN SET-UPS WITH PEDESTAL MICROMETER



Model "AM" Bartelt Pedestal Micrometer (shown) is designed for setting tools in boring bars. Conventional cut-and-try method is unnecessary as tool can be brought to exact position in only one setting. Speed and accuracy of adjustment reduces set-up time and helps importantly to increase production. Bartelt gages, available in six models, are valuable and practical shop equipment for tool adjusting, work positioning, inspection, checking, and many other gaging operations. Write for descriptive circulars today, showing eight models now available for various kinds of work.

## BARTELT ENGINEERING CO.

1214 Partridge Ave.

BELOIT

WISCONSIN



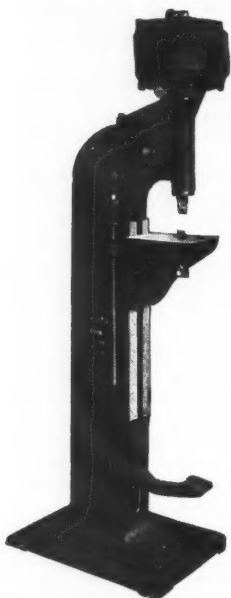
Man Operator Using "Di-Acro"  
Radius Brake

accordance with the predetermined standards recommended by the United States Army Air Corps for aircraft construction. In addition to the forming bars available with the brake having estab-

lished radii of 0,  $\frac{1}{16}$ ,  $\frac{3}{32}$ ,  $\frac{1}{8}$ ,  $\frac{5}{16}$ ,  $\frac{3}{8}$  and  $\frac{1}{2}$  inch, other bars can be made in the user's plant with any radii desired up to  $\frac{1}{2}$  inch.

Case hardened and spring tempered materials that must be formed after heat treating can also be safely and economically worked to accurate dimensions with the Di-Acro Radius Brake, which features a sensitive material action that is claimed to assure sharp and accurate bends. Additional features of the unit include Torrington roller bearings; precision angle degree stops that are quickly adjustable for accurately controlling the angularity of all bends formed; sensi-

tive material gage to assure precision in all duplicated parts; material support to increase accuracy in the gaging of lightweight materials; sturdy reinforced and ribbed machine tool gray iron base;



## PRODUCTION LINE RIVETING CAN BE A QUIET OPERATION

If riveting is an essential operation on your production line, let a Linley handle the job with efficiency . . . minus the noise! Through vertical travel of the spindle, twin rollers contact the rivet end and uniform heads are shaped . . . not hammered.

Six standard machines are available for floor installation with capacities up to  $\frac{3}{8}$ " diameters. Horizontal or direct connected vertical motor drives. Where there are space limitations, bench models can be furnished.

For riveting machines that are designed and built for long service—even for the tough jobs—look to Linley.

Write for Detailed Bulletin

**LINLEY BROTHERS  
COMPANY**

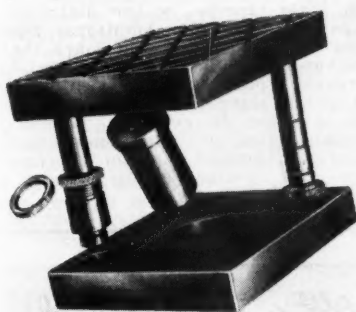
661 STATE STREET EXTENSION  
BRIDGEPORT 1, CONNECTICUT

and two different handle positions which allow operator choice for both convenience and greater production in forming either light or heavy materials. All contact surfaces of the unit are of cold rolled steel, hardened to resist wear, and adjustable in all planes and angles.

The "DiAcro" Radius Brake has a maximum capacity of 16 gauge, maximum forming width of 12 inches, and maximum forming degree of 125.

### "Die Master" Die Set

A die set with phosphor-bronze guide post bushings, to be known as the "Die Master," is announced by the A. W. Gru-



"Die Master" Die Set

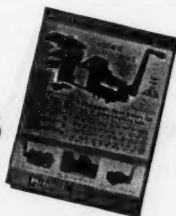
now Co., 563 White St., Orange, N. J. The guide post bushings are tapered and made to turn and contract or expand as desired by loosening a lock ring and turning the adjustment ring accordingly. As lateral thrust wears the bushings, the lock rings are loosened and a slight turn is given the bushings, following which the lock rings are tightened.

In placing the die in its initial position in the set and for final fitting and tryout, the bushings may be adjusted to any degree of tightness desired. When all of the surfaces of the bushings have worn completely, the bushings can be readily and economically replaced.

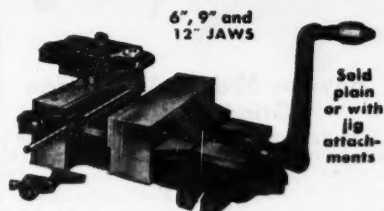
The punch holder and die shoe are made of S.A.E. 1020 machinery steel with flame-cut edges, and are Blanchard ground flat and parallel. When required, steel shanks, simply and sturdily made without threads, are pressed into the punch holder.

The Die Master Die Set can be made to order in any size desired.

For shop tools  
of **EXTRA**  
**USEFULNESS**  
get Bulletin 41



### MULTI - PURPOSE VISE



6", 9" and  
12" JAWS

Sold  
plain  
or with  
fig  
attach-  
ments

**EXTRA USEFULNESS** for hundreds of special-holding repeat-operation jobs, is found in this flush, parallel, square vise with numerous special jaws and attachments. Sizes up to 124 lbs.



### All cut with **STRAIGHT KNURLS**



"Adjust-  
angle"  
Knurl  
Holder

**EXTRA USEFULNESS** features this Knurl Holder which adjusts the angle of straight knurls to cut many different patterns on work up to 2 1/2" dia. "Passing-over-stock" type for quick run-back. Shank to fit your turret.

Request Price Bulletin 41

**GRAHAM MFG. CO.**

31 BRIDGE ST.

EAST GREENWICH, R. I.



Illustration showing five sizes of Raymac Midget All-Carbide Grinding Wheels from 0.030 to 0.235 inch in diameter

### Raymac Midget All-Carbide Grinding Wheel

A midget all-carbide grinding wheel is now being marketed in sizes from 0.030 to 0.250 inch by the Raymac Co., 3729 Cass Ave., Detroit 1, Mich. Designed to completely finish holes to close tolerances, the wheel, it is claimed, can be used to remove metal of any hardness, including Stellite. Moreover, the high modulus of elasticity is said to provide

for maximum stiffness of the cutter shank, thus assuring efficient cutting action with no distortion or tapering of holes.

According to the manufacturer, the Raymac Midget All-Carbide Grinding

Wheel can be resharpened several times with little change in the diameter or shape of the wheel. Additional advantages claimed for the wheel are that it removes metal quickly and automatically increases production by eliminating changes in setup.

In addition to grinding wheels, the company also produces small carbide reamers, standard and midget carbide burs, and special carbide wheels and tools as required.



SHANK TYPE

Light series. Preloaded ball bearings. Replaceable high speed steel points. Smooth, sustained accuracy.

#### BALL AND ROLLER BEARING TYPE

Heavy duty series. Preloaded ball bearings in head . . . roller bearings in shank. Accuracy at high speeds, heavy feeds.

CENTER SPECIALISTS SINCE 1908



THE READY TOOL COMPANY  
550 Iranistan Ave., Bridgeport 5, Conn.

*Now.* YOU CAN SPECIFY  
**RED-E**

**AND SAVE ON CENTER COSTS, TOO!**

At new low costs, RED-E Standard Ball Bearing Centers — designed and built by engineers who thoroughly understand center requirements — are available to meet the majority of applications where high speed steel cutting tools are used. New Departure double row preloaded ball bearings assure accurate performance, longer life under continuous operation. Priced to mean real savings!

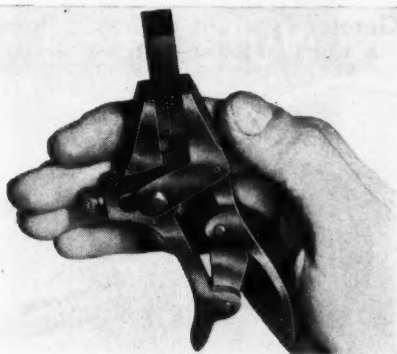
Machine tool manufacturers, production executives, shopmen agree that precision machining depends largely on *precision centers* . . . and is why they so often specify RED-E Centers.

Write today for details.

## "Speetog-Elect" Self-Locking Plier Clamp

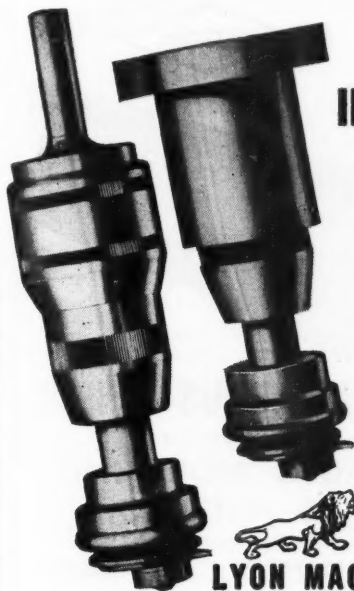
A self-locking plier clamp to be known as the "Speetog-Elect" is announced by Speed Tools Ltd., Vereker Buildings, Greese St., London, W. 1, England. Made from high carbon steel forgings, the clamp is designed primarily for firmly holding parts during drilling, grinding, sawing, riveting, welding, brazing, soldering, and other operations. It can also be used as a tool or bit holder, key extractor, quick-acting clamp, or super plier.

An outstanding feature of the Speetog-Elect Plier Clamp is a construction whereby the steel jaws are said to remain parallel in all positions up to the maximum capacity of the tool, thus providing for a firm grip on the work. Clamping pressure can be quickly and easily applied, with only a light hand grip being necessary to apply the pressure after a knurled adjusting screw on the clamp has been set to suit any width of work from 0 to  $\frac{1}{2}$  inch. The preliminary screw adjustment is such that it can be freely regulated by the same hand that holds the tool, thus affording a light grip when the jaws are parallel on the work. The ensuing toggle action is said



"Speetog-Elect" Self-Locking Plier Clamp

to ensure a gripping pressure of 300 lb. with a hand squeeze of approximately 2 lb. The capacity and clamping pressure of the tool can be adjusted in the same movement in a matter of seconds, and the amount of hand pressure exerted determines the clamping power of the jaws. A light finger pull is all that is necessary to instantly release the clamp.



## The Lyon INTERNAL GROOVING TOOL

Its versatility saves costly preparation time—provides precision grooving of single or multiple grooves at a production rate—plus economy of set-up time—and low initial cost. The LYON has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

By changing only bushings and cutters within the tool model range, you have at your command a wide variety of bore sizes and shapes. A simple adjustment regulates location and depth of groove. Work cannot be scratched or marred because the head of the tool does not turn when the cutter operates.

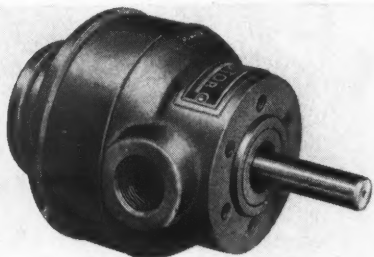
Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.

**LYON MACHINE CO., WORCESTER 3, MASS.**



### Gerotor Type QH Hydraulic Pump

A hydraulic pump designed for high operating pressures, designated as the Gerotor Type QH, is announced by the



Gerotor Type QH Hydraulic Pump

Gerotor May Corporation, Baltimore, Md. Featuring the well-known Gerotor gear mechanism in a stronger, heavier body than heretofore, the pump is designed for operating pressures up to 1,500 p.s.i. intermittent or 2,000 p.s.i. continuous, and is available in capacities of 3, 5, 8, and

12 g.p.m. for plain or flange mounting.

The Gerotor Type QH Hydraulic Pump has a standard speed of 1,200 r.p.m. but can also be operated at other speeds if required. Standard rotation is clockwise facing the shaft end, with counterclockwise rotation available if required. For most efficient operation, the pump is recommended for use with hydraulic oils having a viscosity between 250 and 330 s.s.u. at 100 deg. Fahrenheit.

### Martin Magnesium Safety Press Tools

Five improved types of Magnesium Press Feeding Tongs and Pliers for faster, safer punch press production have been announced by W. I. Martin & Company, 711 S. Dearborn St., Chicago 5, Ill.

These tools represent standardized models of special tools developed during the war for reducing press-feeding accidents in large production plants, and offer three important advantages: (1) They reduce operator fatigue because they weigh only one-fourth as much as steel; (2) they protect operators from accidents by keeping the hands out from



### "HEAVY DUTY" Pneumatic GRINDER

A powerful, versatile tool — can be fitted with three different spindle noses to handle mounted wheels with  $\frac{1}{4}$ " diameter shanks, also unmounted wheels with  $\frac{1}{4}$ " diameter and  $\frac{3}{8}$ " diameter holes. Made with compound rotors, an abundance of power. Fitted with steel body, a real safety feature. Special grease-sealed bearings, no lubrication required. Prompt Deliveries.

Representatives in Principal Cities.

**M-B PRODUCTS**  
130-134 E. LARNED ST.  
DETROIT 26, MICHIGAN



### CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING  
& MFG. CO.**

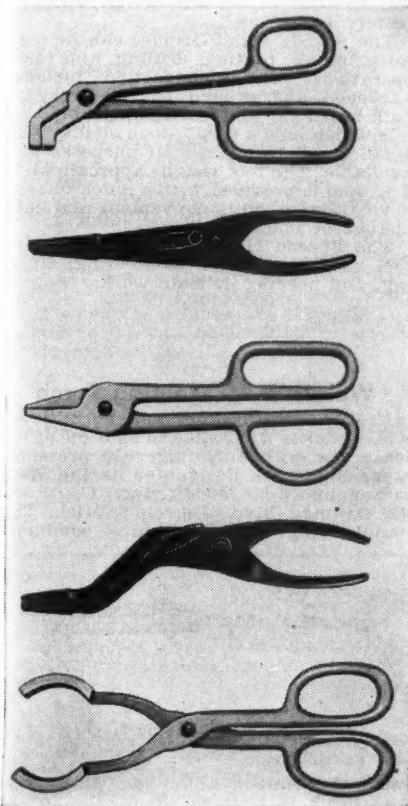
WRITE FOR STOCK LIST

1114 E. 87TH ST.

CHICAGO 19



under the dies in feeding work or removing work from presses; (3) they prevent injury to dies due to the pulverizing char-



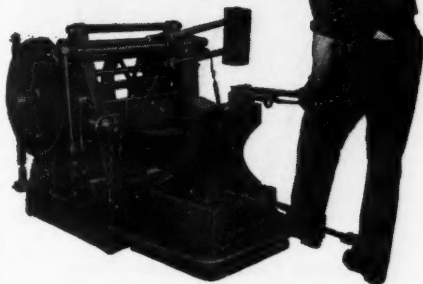
Martin Magnesium Safety Press Tools

acteristics of cast magnesium; if the tip of the tool is accidentally caught in the action of the press it will crumble to dust without ruining costly dies.

The five styles of tools illustrated will take care of practically every type of punch press work adaptable to hand feeding, each shape being especially well suited to handling certain types of jobs. Reading from top to bottom, they are designated as No. 17-C Side Grip Tongs, No. 19-C Offset Pliers, No. 17-A Regular Tongs, No. 19-D Long Nose Pliers, and No. 18 Curved Nose Tongs.

EVERY BLOW

exactly as he  
wants it



Replacing hand sledges and helpers, this direct-gear electric motor-driven power hammer gives the smith complete control throughout the entire forging operation. A foot treadle regulates speed and force of blow, leaving the smith's both hands free to manipulate work on anvil. Result—greater speed, fewer reheats, increased output.

#### DESCRIPTIVE BULLETIN FREE



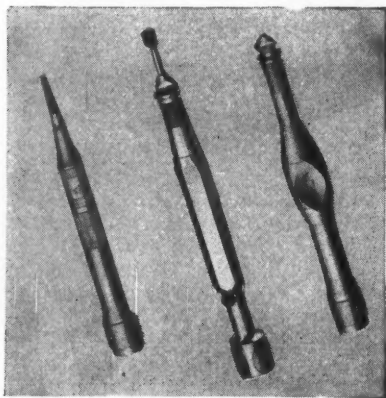
Shows how a McKiernan-Terry Blacker Hammer can save you time and money and increase shop capacity. Ask us for your free copy of Bulletin 56.

**McKiernan-Terry Corp.**  
Manufacturing Engineers  
14 Park Row,  
New York 7, N. Y.

*McKiernan-Terry*  
**BLACKER  
HAMMER**

## Speedo Tools for Flexible Shafts

A line of tools adaptable for connection to flexible shafts driven by fractional-horsepower motors for use in per-



Speedo Tools for Flexible Shafts

forming filing, grinding, hammering, and similar operations on precision work is now being manufactured by the Speedo Manufacturing Co., Inc., 48 W. 48th St., New York 19, N. Y. The filing handpieces are gear driven and can be used for filing small dies, castings, and patterns; beveling; breaking of sharp edges and corners; slotting; piercing; and removing rough ridges. Quick-change attachments enable the tools to be easily and conveniently attached directly to the shaft, which is held firmly by a ball and spring collar.

The filing handpieces can be operated at speeds of from 1,000 to 3,000 r.p.m., delivering strokes from 500 to 1,500 per minute. The handpieces can be obtained

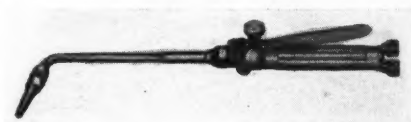
in  $\frac{1}{8}$  or  $\frac{1}{4}$ -inch stroke types, with two interchangeable collets which hold a  $\frac{3}{8}$  or  $\frac{1}{2}$ -inch shank. Special Swiss Pattern machine and needle files are supplied to fit the handpieces, which weigh approximately 4 oz. each.

The Speedo Hand Grinder can be used for grinding, routing, drilling, and other operations. The construction includes hardened and ground shafts, precision ball bearings, and interchangeable collets which hold a 0 to  $\frac{1}{4}$ -inch shank, with smaller collets for special purposes also available. The tool weighs approximately 3 oz. and is provided with a quick-change device that permits convenient and easy change of tools.

The Speedo Hammer is a cam-driven tool used largely for hammering, riveting, and peening delicate work.

## Weldit W-46 Welding Torch

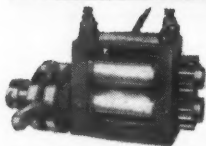
Featuring a full "handle length" lever which makes it possible to shut off or release gas with only finger-tip pressure, a welding torch designated as the W-46 is announced by Weldit, Inc., Dept. 100, 990 Oakman Blvd., Detroit 6, Mich. The handle length lever feature combined



Weldit W-46 Welding Torch

with the built-in automatic Gasaver of the torch is claimed to provide for an unusually wide operating range together with easy and economical operation.

## New GILBERT FRICTION ROLL FEED



Reverses with ONE Simple Operation! In Seconds!

No slippage! Feeds up to 1000 stampings per minute! Made for easy adaptation of "roll lift" (\*extra cost) for 5 to 150 ton presses.

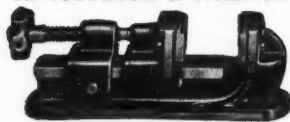
THE ONLY ROLL FEED OF ITS TYPE ON THE MARKET

**MACHINE SERVICE COMPANY**

159 CROOM STREET • PROVIDENCE R. I.

## GEM MACHINE VISES

For TOOL-ROOM or Production.



Six sizes, 3" to 12". Many exclusive features. You see them everywhere. Write for circular.

**J. E. MARTIN MACHINE WORKS**  
Springfield Ohio

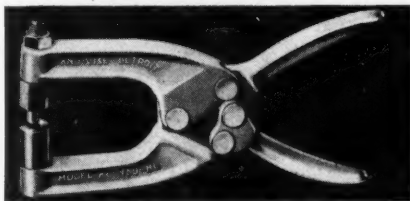
## Copilot Hydraulic Feed Regulator

The "Copilot" Hydraulic Feed Regulator which was announced on page 352 of the December, 1944, issue of MODERN MACHINE SHOP is now being marketed by Edson Engineering Company, 219 Main St., Boonton, New Jersey.

The device is primarily intended for use with hand-fed drilling machines. Attached to such a machine, the Copilot regulates the feed stroke as desired and permits a free rapid return stroke. Applied to a machine that is used for drilling small holes, the device is said to eliminate drill break otherwise caused by crowding the drill, drilling into cavities, or allowing the drill to break through the lower surface of the work. All backlash in the spindle is held back and the spindle is prevented from dropping when the drill breaks through.

The device can be supplied especially engineered to specific jobs.

can be quickly aligned for riveting, spot welding, or drilling. Designated as the Model KL-450-HL, the device, which



Knu-Vise Model KL-450-HL Hole Locator

## Knu-Vise Model KL-450-HL Hole Locator

By means of a hole locator announced by Knu-Vise, Inc., 2201 Eighth St., Detroit 16, Mich., several sheets of metal

looks like and can be operated as simply as an ordinary pliers, has a toggle-action which automatically locks the tool on the work being held, thereby leaving the operator's hands free to perform other work. An easy motion provides for separation of the handles to release the unit.

The pressure spindle of the Model KL-450-HL can be adjusted to accommodate work up to 1 1/4 inches thick, with locating pins being available in all standard diameters. The tool is 8 inches long x 3 inches wide and said to be capable of holding a maximum of 500 pounds.



Types to fit any machine used for tapping or reaming.

## Protection AGAINST Oversize and Bell-Mouthed Holes!

Your best protection against oversize and bell-mouthed holes is a Ziegler Floating Tool Holder—because it affords an easy way of overcoming misalignment between the spindle and the work.

In fact, it is so designed that it compensates for such inaccuracies even though they amount to as much as 1/32" radius or 1/16" diameter.

And, because it does it automatically, it greatly simplifies tapping and reaming, reducing spoilage losses and also reducing set-up time.

Try it and see how it will increase your production rate and, at the same time, enable you to turn out work that meets the highest standards of precision.

WRITE FOR CATALOG

*Ziegler*  
ROLLER  
DRIVE

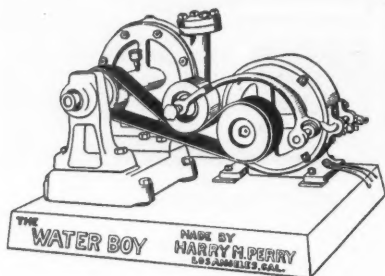
**FLOATING HOLDER**  
for Taps and Reamers...

**W. M. Ziegler Tool Co.**

1928 TWELFTH ST.  
DETROIT 16, MICH.

## Perry "Beltslacker" Idlers

A line of idlers having dynamically balanced pulleys and belt steering adjustments is now being marketed under the



Perry "Beltslacker" Idler Applied to Motor-Driven Pump

trade name of "Beltslacker" by Harry M. Perry, 737 N. Spring St., Los Angeles 12, Calif. Designed to fit the particular installation in which they are used, the idlers are Timken-bearing equipped and may be used with flat or V-belts. They

can be operated at speeds up to 6,000 r.p.m. and with feeds up to 7,500 feet per minute.

The automatic tension control provided on each Perry Beltslacker Idler consists of a compression spring, hollow piston, and full-threaded rods, all located in an oil-tight cylinder. The control is adjustable while operating, and one or two controls may be used, depending upon the size of the idler. On some very small single-arm idlers, ball bearings and an open tension spring is used, with adjusting chain and hook.

## Erickson Custom-Built Precision Expanding Mandrels

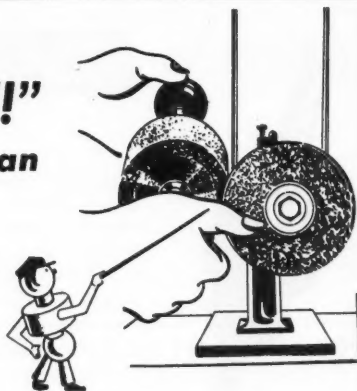
The accompanying illustration shows special features which can be incorporated in the standard line of precision expanding mandrels offered by the Erickson Tools Div., Erickson Steel Co., 2309 Hamilton Ave., Cleveland 14, Ohio. These include locating or driving pins which are often interchangeable and may be of various lengths. Handwheels can also be furnished, as well as spline, hex, square, or step-type sleeves which enable the mandrel to be used for a variety of jobs.

## "HERE'S WHERE I can SAVE YOU MONEY!" Says The Metcalf Minute Man

What The Metcalf Wheel Dresser Does:

- ★ Brings up sharp corners on this wheel.
  - ★ Trues up a square edge.
  - ★ Turns a bevel rapidly and accurately.
- Famous three-fold Metcalf principle:
- ★ Cutting effect of one abrasive wheel on another—
  - ★ Hi-speed, gyroscopic action—
  - ★ Steadying effect of heavy ball-handles.

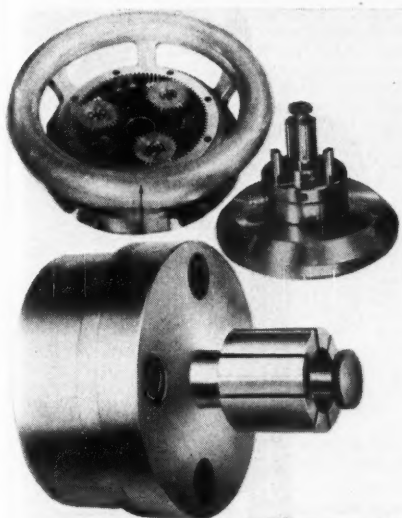
Wheel replacement costs little—means added savings and greater profit for you. Write today for full details in Bulletin M-47.



For Thin or Small Grinding Wheels

<p>ELECTRIC BRAZERS ANVILS AND HAMMERS BAND WHEEL GRINDERS MISCELLANEOUS SAW &amp; PIPE FITTING EQUIPMENT</p>	<p><b>HANCHETT MANUFACTURING CO.</b> SAW AND KNIFE FITTING MACHINE DIVISION BIG RAPIDS, MICHIGAN U.S.A.</p>	<p>SAW SHARPENERS SAW STRETCHERS KNIFE GRINDERS SWAGES AND SHAPERS WELDING CLAMPS</p>
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According to the manufacturer, very close tolerances can be held on parts to be machined through the use of Erickson Custom-Built Precision Expanding Mandrels. In the latter, all essential features of the standard mandrels are said to be



(Above) One of many designs of Special Erickson Precision Expanding Mandrels. (Below) One of many Standard Erickson Precision Mandrels

retained, including guaranteed accuracy of 0.0005 inch, vise-like grip on interior surfaces throughout the expansion range of  $\frac{1}{8}$  inch, and shanks to accommodate many sizes of sleeves in increments of  $\frac{1}{32}$  inch.

### Whiting Portable Electric Hoist

A roller-chain electric hoist is now being offered in  $\frac{1}{4}$ ,  $\frac{1}{2}$ , and 1-ton capacities by Whiting Corp., Harvey, Ill. The 1-ton unit weighs 87 lb., thus enabling one operator to install it or move it without assistance.

The Whiting Portable Electric Hoist utilizes a simple double-reduction totally enclosed worm-gear drive which provides for compactness and lightweight and a reduction in the number of wearing parts. Precision ball bearings are used throughout. The hoist frame is a steel casting.



Every Forsberg Blade bears the famous WHALE BRAND mark of quality. Scientific heat treating and thorough check every step of the way, plus a severe bending pounds test gives Forsberg Blades superior performance. The popular HY-FLEX Blade meets today's demand for extreme flexibility at medium price—it has the guts for solid service.

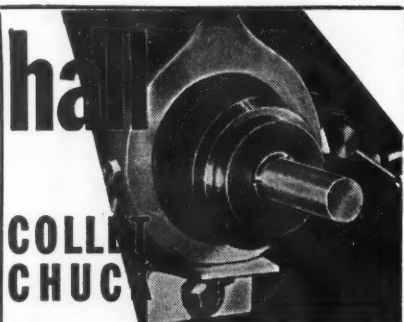


A Whale of a Blade—MO-HY'S special molybdenum steel gives unusual cutting service—same speed as tungsten with comparable performance. For outstanding results on stubborn jobs, ask your mill supply house for WHALE BRAND HY-FLEX and MO-HY BLADES.

Get to know the satisfaction in Whale Brand Hack Saw Blades and Frames • Band Saws • Coping Saw Frames and Blades • Screw Drivers • Hand Drills.







**COLLET  
CHUCK**

**SPEED UP** production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

*Two-inch capacity, now only \$145.*

*One-inch capacity, \$95.*

Round, square or hex collets, plain—serrated

**HALL MANUFACTURING COMPANY**

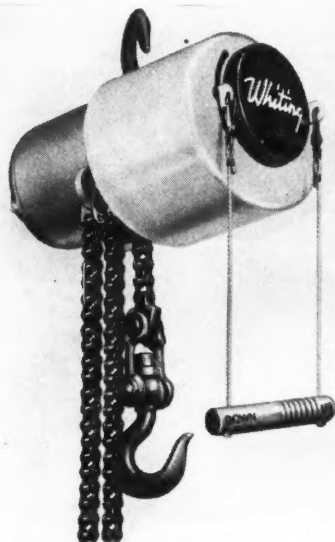
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for the right job!**

**FORD**

Produces three distinct lines of teeth to meet all filing requirements—  
1. Hand Cut Files, 2. Ground Bars, 3. Carbide Cutters.  
Solely Filed Exclusive for Over 25 Years  
**M. A. FORD MFG. CO., INC.**  
244 W. FIRST STREET DAVENPORT, IOWA, U.S.A.

thus the load is carried on steel from hook to hook, assuring maximum safety. A patented self-energizing motor brake, which is said to require no adjustment, interlocks with the controller to provide



**Whiting Portable Electric Hoist**

safe operation. Upper and lower safety limit switches are included in the design.

The alloy steel roller chain operates over an extra large sprocket so as to assure smooth operation and reduce chain wear. The load hook has a universal action and swivels on ball bearings, thus preventing the roller chain from twisting. Control is afforded by means of a single-bar grip which can be operated with one hand, thus allowing the other hand to be free for steadying the load.

An outstanding advantage of the Whiting Portable Electric Hoist is the fact that it can be operated in an inverted position. This arrangement is said to be particularly desirable where the overhead suspension point is high.

### **Nicholson Type R Radiator Trap**

Designated as the Type R, a radiator trap for vapor and steam heating service is now being introduced by W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre,

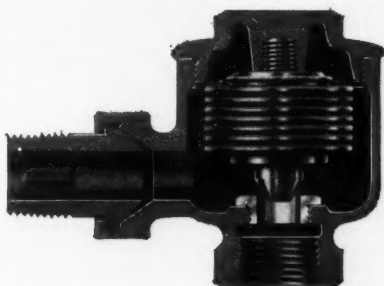


Pa. The trap is a thermostatic bellows type utilizing a patented balanced vapor-pressure principle which provides for maximum valve opening with slight temperature difference between steam and condensate. The unit is designed to afford positive operation on vacuum or vapor pressure heating systems up to 25 lb. without adjustment or change of the valve orifice. The valve is wide open when the trap is cold and closes immediately when steam contacts the bellows. The large diameter valve orifice and multiple bellows convolutions afford large water and air discharging capacity.

The bronze bellows of the Nicholson Type R Radiator Trap is formed from seamless tubing by a hydraulic process. An internal stop is provided to prevent excessive compression of the bellows. The nickel alloy valve is welded to the natural heavy closed end of the bellows tubing, forming an integral unit which is said to assure alignment of the valve and bellows. The valve is provided with a renewable stainless steel seat, and the body, cap, and union of the trap are made of corrosion-resistant brass. The exterior of the unit is provided with a dull nickel-plated finish.

The Nicholson Type R Radiator Trap is available in two models designated as

the Series 2A and Series 4A. Both models are intended for draining condensate and air from vacuum and vapor heating devices up to 25 lb. maximum pressure. The



Sectional View of Nicholson Type R Radiator Trap

Series 2A has a nominal capacity of 200 square feet equivalent direct radiation at  $1\frac{1}{2}$  lb. pressure differential, and the Series 4A has a nominal capacity of 400 square feet equivalent direct radiation at  $1\frac{1}{2}$  lb. pressure differential. Both models

# No Leaks No Levers No Packing

*Air-O-cheks have the ball and socket joining the enclosed lever to the valve.*

*Note double grip afforded by long, extra heavy ferrules machine-formed over special shoulder on shank.*

**Air-O-chek AIR GUNS**

Made of Bar Brass and Stainless Steel

Comparison quickly demonstrates such Air-O-chek advantages as leak-proof operation, ease of use, dependability and time saving.

That's why four out of five plants adopt Air-O-chek Air Guns as standard after a comprehensive test.

Try it. Install a dozen Air-O-cheks and compare results with the best you ever had. Prompt delivery on high priority. Sizes for all requirements. Catalog on request.

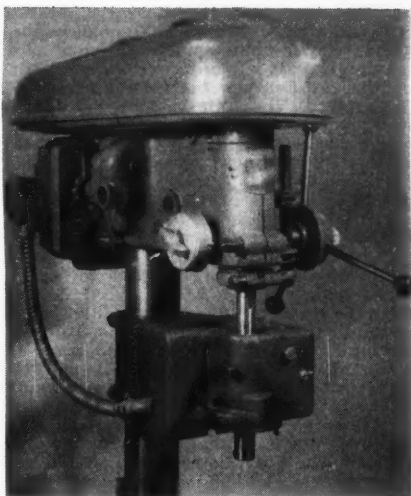
**AIR-WAY PUMP & EQUIPMENT COMPANY, 403 S. Jefferson St., Chicago 7, Ill.**

are made in angle types only in  $\frac{1}{2}$  and  $\frac{3}{4}$ -inch pipe sizes with male union inlets and female pipe thread outlets. The Series 2A incorporates a large diameter bellows with seven convolutions and the Series 4A a large diameter bellows with twelve convolutions, both designs permitting maximum valve lift without over-stressing of the bellows metal by excessive deflection.

### Rotorex Precision Tapping Attachment

A new model of its Rotorex Precision Tapping Attachment, which is applicable to all popular model drill presses and is designed to provide Class III threads with unskilled labor in 0-80 to  $\frac{1}{8}$ -inch sizes, is announced by the Douglas Machinery Co., 150 Broadway, New York 7, N. Y. According to the manufacturer, the attachment provides for positive, automatic control of lead to assure precision tapping, as well as accurate control of depth to a tolerance of 0.010 inch.

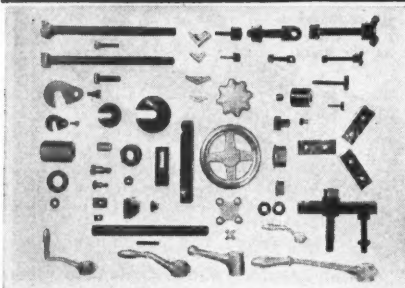
Lead screws of the Rotorex are hardened and precision ground, well lubricated, and fully enclosed for protection from dirt. Other features include instan-



Drill Press Equipped with Rotorex Precision Tapping Attachment

taneous emergency reverse, completely automatic cycle, and foot control which leaves operator's hands free for loading work. The Rotorex, it is claimed, can be completely installed in  $\frac{1}{2}$  hour or less, and change-over from tapping to drilling or vice versa can be effected in five minutes. The attachment is said to require slightly more vertical space than the ordinary tapping chuck and is simple in construction and operation.

### BETTER TOOLS — *Lower Cost*



• Jergens Standard Accessories cut costs . . . save time! This complete line of precision units enables tool engineers to design faster . . . to build better at lower cost! Jergens' parts are engineered to highest standards for maximum efficiency. Available for immediate shipment. Write for Catalog containing templates of all items and Price List.

ASK FOR CATALOG 4-4

**Jergens TOOL SPECIALTY CO.**

712 E. 163rd St. CLEVELAND 10, OHIO

### Airco Stainless Steel Electrodes

A complete line of stainless steel electrodes in a full range of grades and diameters has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. All electrodes are furnished with a heavy extruded lime type coating for d.c. application. In addition, all electrodes but the straight chrome analyses are obtainable with a lime-titania type coating which is usable on a.c. or d.c. The slag produced by these coatings is said to be easily removable.

According to the manufacturer, electrodes with the lime-titania (a.c.—d.c.) type coatings offer many desirable advantages not found in the lime-type coating electrodes. For example, satisfactory usability on a.c. is said to eliminate arc blow and result in unusually easy manipulation, uniform arc action, and bet-

ter appearance of deposit. This class of electrodes can be recommended for all applications on which the lime type of electrode is used, with the possible exception of highly restrained joints on heavy sections or on steels of high hardenability.

### Palmgren No. 15 Hand Vise

To facilitate the handling of small parts and at the same time ensure safety during both bench and production operations, the Chicago Tool & Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill., has introduced an aluminum hand vise which is said to grip work solidly without marring or scratching. Designated as the Palmgren No. 15, the vise weighs 7 oz. and is 5 inches long, thus making it light and comfortable to handle.

The 1½-inch wide jaw faces, which open to 1½ inches, are accurately machined to provide true surfaces. Made of aluminum, they are sufficiently softer than most pieces held so as to provide a "velvet grip" that prevents the jaws from "biting" or marring the work, the manufacturer states.

The Palmgren No. 15 Hand Vise is said



Palmgren No. 15 Hand Vise

to be ideal for use by tool and diemakers, manufacturing jewelers, metalworkers, machine manufacturers, repair, school and home workshops.



## BUTTERFIELD TAPS

BUTTERFIELD TAPS can be supplied in four different grades as follows: 1. Carbon Steel Cut-Thread Taps. 2. High-Speed Steel Cut-Thread Taps. 3. High-Speed Steel Commercial Ground-Thread Taps. 4. High-Speed Steel Precision Ground-Thread Taps.

### UNION TWIST DRILL CO. BUTTERFIELD DIVISION

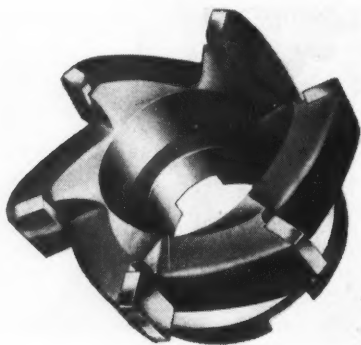
Factories: Derby Line, Vermont, U.S.A.  
Athol, Mass.; Mansfield, Mass.;  
Rock Island, Quebec, Can.

#### STORES:

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Chicago.....11 S. Clinton St.  
Detroit.....5527 Woodward Ave.  
New York.....61 Reade St.  
Toledo.....3636 Detroit Ave.

## Vascoloy-Ramet Shell End Mills

The Vascoloy-Ramet Corp., North Chicago, Ill., announces a line of "Red Streak" carbide-tipped and "Blue



Vascoloy-Ramet Shell End Mill

Streak" Tantung-tipped shell end mills. The tools are manufactured in right and left-hand styles, ranging in size from 2½

to 4½ inches O.D. and bores from 1 to 1½ inches.

The Red Streak carbide-tipped shell end mills are available with negative radial and axial rake angles for milling steel, and zero rakes for milling cast iron, non ferrous and non-metallic materials.

## Karelsen Glass Cutting Machine

To increase efficiency and accuracy in cutting glass circles, E. Karelsen, Inc., 125 W. 45th St., New York 19, N. Y., is now introducing the glass cutting machine shown in the accompanying illustration. The arm of the unit is shaped so as to bring the top of the handle within approximately 10½ inches of the platform, leaving ample space for the operator's hand for inserting and removing glass to be cut. The machine is finished in blue enamel to prevent rust and to also afford a color most restful to the eyes. The handle, which is a polished hickory, is also made so as to fit the hand comfortably.

The semi-cast steel arm of the Karelsen Glass Machine is mounted on a 7-ply ¾-inch plywood base which is reinforced, stained, and highly polished. The spindle

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**DRILL**



**12"  
LONG**

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**Straight Shank Drills**

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**Eastern Tool Supply Co., Inc.**

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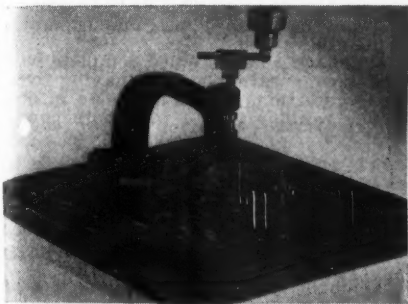
1/8"	\$1.70
9/64"	1.70
5/32"	1.70
11/64"	1.70
3/16"	1.70
13/64"	1.82
7/32"	1.82
15/64"	1.99
1/4"	1.99
17/64"	2.11
9/32"	2.11
19/64"	2.29
5/16"	2.29
21/64"	2.58
11/32"	2.58
23/64"	2.87
3/8"	2.87
25/64"	3.17
13/32"	3.17
27/64"	3.46
7/16"	3.46
29/64"	3.75
15/32"	3.75
31/64"	3.75
1/2"	3.75

## FREE COPY

**MACHINE SHOP EQUIPMENT**—125 page fully illustrated catalog describes a large variety of drills, reamers, cutting and lathe tools, vises, etc.

or shaft is a hardened drill rod with steel bushings inserted in the cast arm. The bushings are bored, reamed, and ground to a mirror finish to eliminate play and ensure lasting accuracy.

The head attached to the spindle for the handle is made of precision, milled



Karelsen Glass Cutting Machine

cast bronze with a special milling cutter. The head is said to ensure an absolutely square fit and is held in place by two machine screws. A cast bronze arm located at the bottom of the spindle is also precision milled and fastened to the spindle by an Allen set screw.

The square bar for regulating the cutting size of circles, as well as the handle bar, is made of cold rolled steel and fits into the arm at a true right angle with the spindle. The head attached to this bar, which is designed to hold either a diamond or a wheel and pin and has a round hole to permit accurate adjustment to the right or left, is accurately drilled so as to be at a right angle to the glass. The head is fastened to the bar with a machine screw and the pin is held in the head with a thumb-screw. The bar is rounded on the end to allow free forward and backward adjustment.

### Standard Redesigned Infinitely Variable Speed Buffing and Polishing Machine

A redesigning of its infinitely variable speed buffing and polishing machine in the 2 and 3 h.p. sizes is announced by The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio. The accompanying illustration shows a machine of enclosed spindle construction with four ball bearings, sight feed oil

## TAPPING TIPS

From Woody Spencer's Notebook

### OVERCOATS FOR TAPS



One thing a lot of the boys gripe about is gettin' a fresh gripe about the tool crib and tap from the tool crib and then findin' it's no good 'cause the edge has been damaged. Way I figure it, keepin' 'em. in shape is as important as usin' 'em. Most shops have some way of protectin' fresh sharpened taps, but the best I've seen lately is in a big shop where they use lots of taps. They dip taps (and other edged tools) in a nitro-cellulose solution (dope to you) after sharpening. Then they strip off the coating when they hand out the tap. Coatin's are remelted and used over again. Sure keeps the taps in good shape and saves a lot of time and trouble changin' and regrindin' taps.



These Tapping Tips of Woody's aren't intended to offer any technical advice or suggestions on tapping problems. They're merely ideas, hints and short cuts Woody has picked up in his rounds of the shops and they're put in here to help as much as they can in making routine tapping jobs run a little smoother and quicker.

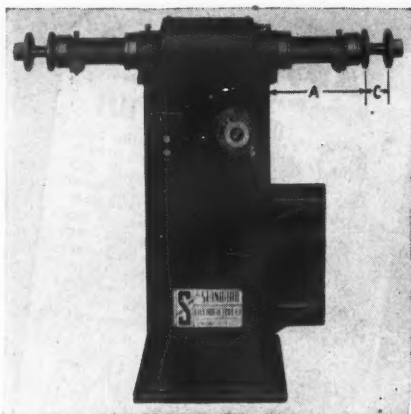
For the technical problems that come up with so many tapping jobs, it's wise to get advice from the engineers. Send us complete information on the job—material to be tapped, diameter and depth of hole, whether it's through or blind, allowance for chip clearance, lubricant used, etc. Our engineers will be glad to give you definite, technical suggestions covering the problem.

NOTE: Woody Spencer's Tapping Tips will appear here as often as Woody gets time to write them up. Look for them. Woody Spencer's Handy Tap guide is packed with useful information on tapping. It's free. Write for your copy on the Company letterhead.

THE RIGHT TAP AT THE RIGHT TIME.

*The Wood & Spencer Company*  
Cleveland 3, Ohio





**Standard Redesigned Infinitely Variable Speed Buffing and Polishing Machine**

gage on each bearing housing, and shaft lock. If desired, the machine can also be supplied with an exposed or open spindle.

The enclosed ball bearing motor is lo-

cated on an adjustable base attached to the back of the pedestal, with power transmitted to the spindle through a belt drive. Any spindle speed between 1,500 and 3,000 r.p.m. can be instantly obtained by merely turning the "Speedial" control on the front of the machine. Each change in spindle speed is immediately recorded on the dial. The drive is properly guarded to afford maximum operator protection.

The machine is supplied complete with push-button safety starter having overload protection, and is available in nine models ranging from 1 to 15 horsepower.

### "Flash" Circle Burner

Designed to eliminate guesswork and to increase the utility of torches in performing flame cutting operations, a torch attachment for cutting accurate circles, curves, and straight lines in plate, to be known as the "Flash" Circle Burner, is announced by the Scientific Research Co., 1718 N. Vancouver Ave., Dept. F-14, Portland 12, Ore. Streamlined for quick and simple height and radius adjustment, the attachment can be used in any position—vertical or horizontal. A ball

**A Guide for  
Diemakers**

**● Precision Bored on  
Master Plates**

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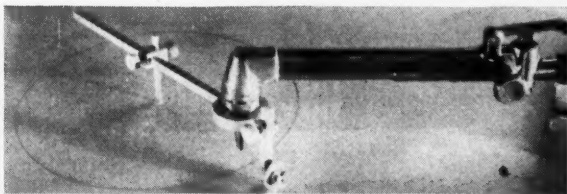
**ACME-DANNEMAN**  
National distributors for "Danneman Die Sets"  
207 LAFAYETTE ST., NEW YORK 12, N. Y.



### "Flash" Circle Burner

bearing rotary head is said to ensure easy, free-running operation, either clockwise or counter-clockwise.

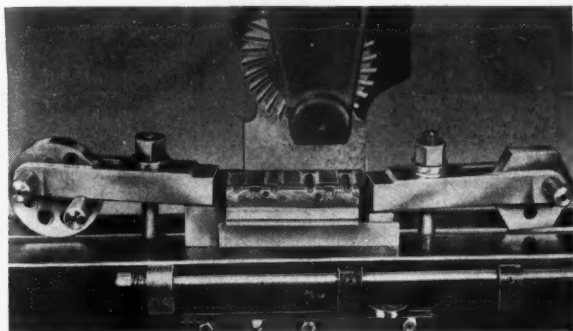
A square radius bar is provided to prevent twisting or clogging of the attachment, and the burning torch is always parallel to the centering pin to ensure an even, perpendicular cut, it is claimed. To prevent gumming or sticking when exposed to flame, the tracking wheel is heat treated. With the tip always held at a predetermined distance from the work by the tracking wheel, tip damage from overheating is minimized. By means of an adapter, the tracking wheel may be set at a distance behind the head to allow circle burning to the edge of a plate. The Flash Circle Burner is designed to burn a minimum 2½-inch circle to a 17-inch maximum. An extension radius bar with adapter is available to make circular cuts up to 10 feet in diameter.



### Robbins No. 3 Drillmatic Drilling Machine

The Robbins Engineering Co., 318 Midland Ave., Detroit 3, Mich., announces an automatic drilling machine, the Robbins No. 3 Drillmatic, designed specifically for special purpose adaptations. Tooling heads are mounted on the machine saddle by means of standard locating and hold-down holes. Any number of spindles may be included in the head, and all are driven by the machine spindle. When operations change, the head can be removed and a new one mounted.

Two hardened and ground alloy steel guide bars are firmly gripped in the saddle, making the saddle and bars an integral unit. The bars slide in four large, hardened and ground alloy steel bushings



### INSTANTLY ADJUSTABLE WORK HOLDER CLAMP

(Patent Pending)

For use on: Milling Machines,  
Presses, Planers, Boring  
Mills, Grinders, Shapers,  
Lathe Face Plates, Jig Boreers,  
Jigs and Fixtures.

Turn non-productive time into labor with this compact work holder. Set of clamps shown above holds work with great pressure and no blocking material nor shims are needed. Easy to adjust, simple and handy.

Choice of round or hexagon height position blocks. Minimum adjustment of .026" obtained instantly. 5" maximum clamping height. Made in five sizes. From \$14.50 to \$24.00 per set of two clamps. (Deliveries within three weeks.)

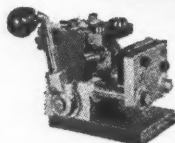
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**THE TIME  
THEY SAVE!**



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## PIPE JOINT COMPOUND

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### ELIMINATES LEAKS

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Water, gas, and air lines. Non-Poisonous—  
non-hardening. Clean and easy to apply.  
Order a 1 Gal. Can at \$2.90.

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*East Shore  
Announces*

purchase of manufacturing  
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Boring and Reaming Tool  
and allied products. These  
tools are now being pro-  
duced in the East Shore Fac-  
tory, well known for years  
of manufacture of precision  
automotive parts, the Glenny  
Broach, etc.



**THE EAST SHORE PUMP**

A positive dis-  
placement unit  
for liquids hav-  
ing lubricating  
properties, water,  
coolants, chemi-  
cals, gasoline, hy-  
draulics, etc.

**THE VELSEY Black Granite  
SURFACE PLATE**

Olivine Diabase,  
a superior form  
of black granite,  
which produces  
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most accurate  
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plate.



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Broaches key-  
ways accurate to  
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**THE STATE  
BORING & REAMING  
TOOL**

Patented, multi-  
ple, interlock-  
ing cutters that  
bore and ream at  
the same opera-  
tion. Higher  
speeds, greater  
feeds than single  
point or double  
end cutters.



**THE STATE  
CORE DRILL**

The modern re-  
placement tool  
for fixed center  
drills—greatly  
reducing cost per  
hole.



**THE DIALSET  
BORING TOOL**

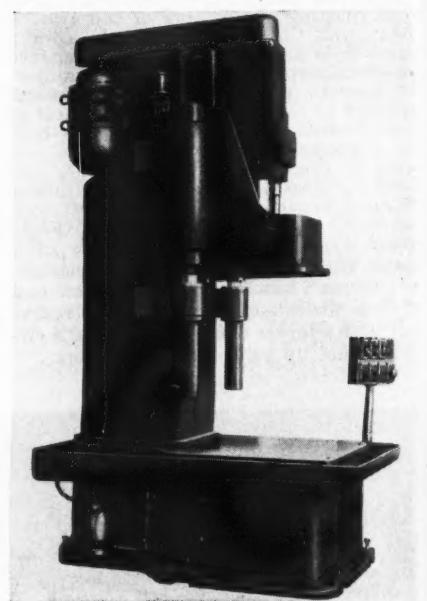
A single cutter  
boring bar which  
adjusts to posi-  
tive accuracy  
through micro-  
meter adjustment.

SEND FOR PARTICULARS

**EAST SHORE MACHINE PRODUCTS CO.**  
CLEVELAND 10, OHIO

mounted on the machine column. Each guide bushing contains a wiper and is lubricated automatically from a central oiler. In every position of the stroke, the guide bars are said to have uniform surface engagement and rigid bearing. Due to the increased surface engagement of the bars, localized wear and scraping are claimed to be eliminated.

The saddle is operated by a ram from the hydraulic unit mounted on the ma-



Robbins No. 3 Drillmatic Drilling Machine

chine column above the saddle. Thus, the hydraulic pressure is directly over the work, eliminating friction on the guide bars due to tool thrust and adding to the smooth operation of the machine. The guide bushings are located on the machine column so that as the saddle feeds into the work, it approaches the bushings. Thus, when the tools are cutting, the saddle is adjacent to the guide bushings and therefore has maximum support. Moreover, the machine column is many times oversize and is fully supported from the base, assuring absolute rigidity.

The hydraulic power for the Robbins No. 3 Drillmatic is supplied from a compact, self-contained unit mounted at the

top of the machine column. The hydraulic pump, pump control mechanism, oil sump, and hydraulic cylinder are fully enclosed.

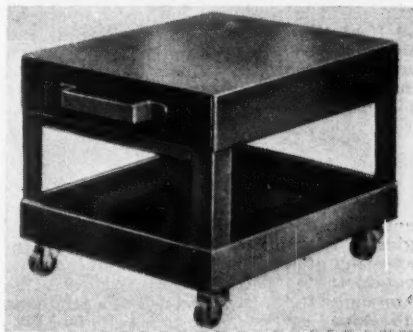
The pump control is so designed that only the amount of oil required to perform the operation is supplied through the variable delivery pump. As the resistance to the machining thrust increases, the amount of hydraulic pressure is increased in direct proportion. The spindle is arranged so as not to jump forward when the tools break through the work. In addition, the saddle is fully counterweighted to produce smooth performance with minimum power.

A wide variety of spindle speeds is available by the use of the change gears within the unit and also by changing the V-belt cone pulleys on the motor and spindle.

In addition to the center tooling saddle, auxiliary units may be mounted around the base horizontally, vertically, or any angle in between. By using such auxiliary units, several operations can be performed at once and with one clamping of the work. To mount these units, "wings" are welded to the base of the machine at the required position, thus making the auxiliary an integral part of the machine.

### "Handy-Andy" Scooter

A four-wheeled mechanic's scooter for use in garages, service stations, farm shops, factories, and other places where



"Handy-Andy" Scooter

work confines one to bending over or kneeling down is now being introduced under the trade name of "Handy Andy" by the H. D. Campbell Co., Rochelle, Ill.



**Flexible Shaft  
Attachment**

Write for Bulletin 201

**ELECTRO-MECHANO**



261 E. ERIE ST.  
MILWAUKEE 2, WIS.

**SELECT**

***Speed-Right***

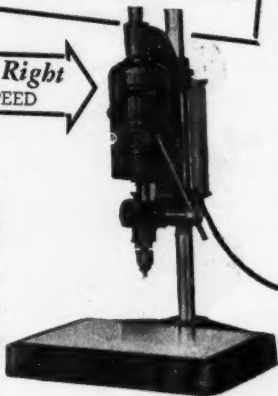
**FOR YOUR TOOL ROOM**

THE *Right*  
SPEED

For tool room precision, do your small hole drilling at the *Right* speed—instantly set and accurately maintained with finger-tip regulated speed control governor.

For holes .004" to 5/32" in diameter.

Speed ranges are 1000 to 10,000 or 2500 to 15,000 RPM—the *Right* speed for metal burrs, rotary files, etc., used in the Flexible Shaft Attachment.



The scooter can be used for repairing automobile wheels, painting and scrubbing floors or low walls, office filing, and numerous other jobs.

The Handy-Andy Scooter is constructed of steel which is finished in metallic gray, and is provided with a convenient shelf at the bottom for tools, books, and so on, as well as a top drawer in which small accessories may be stored. The unit measures 11 inches high x 10 inches wide x 12 inches long and weighs 10 pounds.

### Cesco Speed-Shift Goggle

Designed to simplify the difficulties encountered by welders in shifting goggles to their forehead for layout and inspection of work, a goggle mounted on a comfortable plastic headgear, to be known as the Cesco Speed-Shift, has been developed by the Chicago Eye Shield Co., 2300 Warren Blvd., Chicago 12, Ill. The design of the goggle is such that the welder can move it in and out of position with a quick flip of one hand, and there is said to be no interference with personal glasses worn under the goggle.

The goggle cups are attached to the headgear and controlled by coil springs with sufficient tension to eliminate pres-



Cesco Speed-Shift Goggle

sure yet strong enough to hold the goggle firmly in place. The goggle cups are adjustable to individual face requirements. The headgear is made of flexible form-fitting plastic and can be easily adjusted to any head size.

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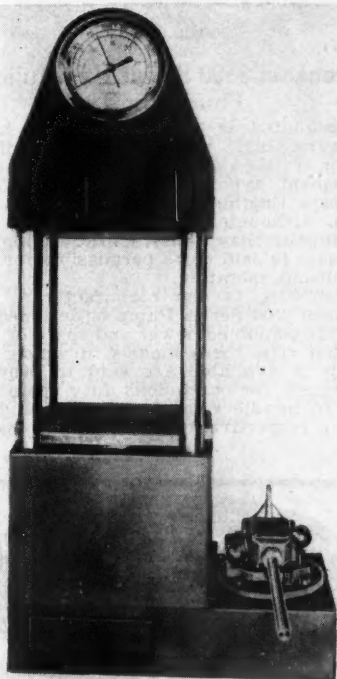
**Manufacturers of Precision  
Knee Type Milling Machines  
and Production Attachments**

**BURKE MACHINE TOOL CO.**

500 Sandusky Street  
CONNEAUT, OHIO

## M & N Model L-30 Hydraulic Press

Said to be ideal for fine work requiring the use of an accurate hydraulic press, the M & N Model L-30 Hydraulic Press illustrated herewith has been brought out by the M & N Machine Tool Works, 144



M & N Model L-30 Hydraulic Press

Orono St., Clifton, N. J. The design of the unit, which has a capacity of 30 tons, includes four columns, an upward moving platen, and completely enclosed base containing a hand-operated pump.

Specifications of the M & N Model L-30 Hydraulic Press are as follows: ram diameter, 6 inches; opening between rods, 8 1/4 inches left to right and 9 inches front to rear; daylight opening, 10 inches; diameter of columns, 1 1/4 inches; maximum stroke, 6 inches; height to platen, 14 inches; overall height, 42 inches; floor space, 9 x 18 inches; height of base, 4 inches; and approximate weight, 400 pounds.



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Follow the lead of other machine tool builders...make VIMCOLIGHT *direct lighting* standard equipment on your machines. This adjustable non-glare light has helped many to gain more output per man hours. Your customers expect this vital production aid which costs so little to provide. Write for complete details.

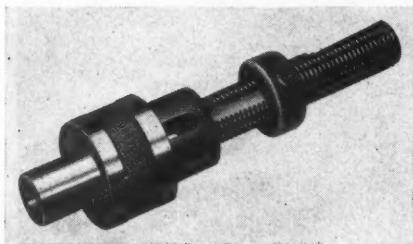
ON-THE-SPOT LIGHTING from ANY ANGLE

**VIMCO**  
MFG. COMPANY, Inc. 111 BRAYTON ST.  
BUFFALO 13, N. Y.



## "Tool-Flex" Neoprene-Mounted Toolholder

According to the Burg Tool Mfg. Co., 5028 W. Jefferson Blvd., Los Angeles 16, Calif., holes  $\frac{1}{8}$  inch center to center can



"Tool-Flex" Neoprene-Mounted Toolholder

be tapped with the "Tool-Flex" Neoprene-Mounted Toolholder now being marketed by this firm. The toolholder, which has an Acme-threaded shank to allow for use in performing multiple-spindle tapping operations, consists of four parts; namely, a shank, collet, oil-

resistant Neoprene mounting, and locking ring.

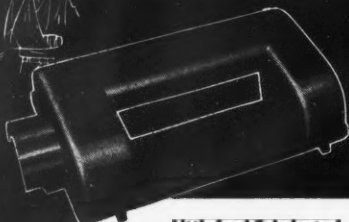
The Neoprene mounting is said to minimize tap breakage by compensating for misalignment. Bell-mouthing and oversize holes are claimed to be eliminated by the full-floating mounting. All metal parts of the unit are precision ground of heat-treated alloy steel.

## Denison 3500 Series Hydraulic Fluid Pump

Designated as the 3500 Series, a high pressure, high volume hydraulic fluid pump of the axial piston, constant displacement type is announced by The Denison Engineering Co., Columbus 16, Ohio. Although rated at 3,500 p.s.i. for continuous heavy duty operation, higher pressure is said to be permissible for intermittent operation.

According to the manufacturer, the Denison 3500 Series Pump is designed to provide combined power and speed of operation. The three models in which the pump is available are said to provide 3,500 p.s.i. for continuous duty operation and to handle volumes of 6, 17, and 32 g.p.m. respectively at 1,200 r.p.m., main-

## STOP THIS With Gear Guards

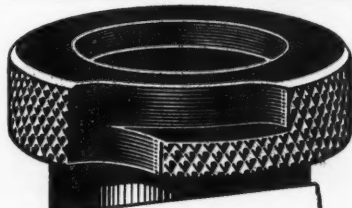


Littleford Fabricated Guards cost nothing compared to lost time and suffering. Fabricated to specification, to cover gears, chains, belts, wheels, on any size machine. Send blueprints for free estimate.



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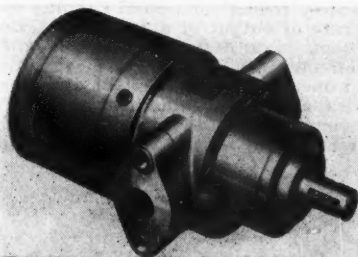
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P.O. Box 37, Harper Station, Detroit 13

**COLONIAL  
DRILL JIG BUSHINGS**



taining volumetric efficiencies of not less than 95 per cent.

Outstanding features claimed for the Denison 3500 Series Hydraulic Fluid Pump include quiet operation at all pres-



Denison 3500 Series Hydraulic Fluid Pump

sures; high pressure, high volume, constant displacement design; minimum parts; compact construction; elimination of all thrust bearings; unique two-piece shaft which absorbs deflection and minimizes bearing wear; axial piston design which provides for long trouble-free service; pressure balanced piston shoe

which eliminates all direct contact between shoe and cam plate; and simplified operating principle through unique placement of bearing load.

Two types of mounting, foot and flange, in addition to the face mounting of the pump provide a variety of methods for the installation of the 3500 Series. The mountings are available in sizes corresponding to the various sizes of the three pump models and incorporate features that permit maximum flexibility and installation arrangements to meet individual preferences.

### Sticht Model SX Stationary Tachometer

Designed to fill the need for a large size accurate and long-lasting tachometer for permanent mounting on paper machinery and for numerous other applications where visibility and readability from a distance are of prime importance, the Sticht Model SX Stationary Tachometer illustrated herewith has been placed on the market by the Herman H. Sticht Co., Inc., 27 Park Pl., New York, N. Y. Built to indicate r.p.m., f.p.m., y.p.m., sheets per minute, impressions per minute or

## ROGERS

### PATENT ADJUSTABLE HOLLOW MILLING TOOL

Quickly and easily adjusted—rugged in construction—rigidly locked when on the job.

Carbide tipped blades optional, are quickly interchanged with the high speed steel blades, for cutting the harder or gritty materials.

The Rogers 61 years experience in Special Tool Design is always available to your firm.

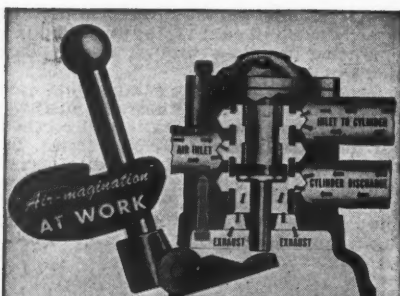
Write for catalog

**THE JOHN M. ROGERS  
TOOL CORP.**

Gloucester City

New Jersey



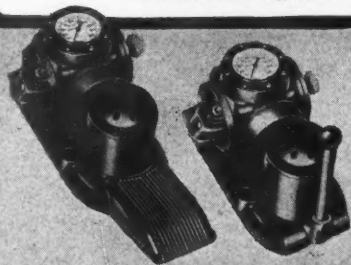


### Lehigh-MARTON PISTON TYPE 4-WAY VALVE

#### "Air-magination" SAVES SPACE • TIME • MONEY

Diagram above shows simple, rugged design of new Lehigh-MARTON Piston-Type Air Valves. Easy to install. Simple to maintain. Adaptable to all compressed air uses.  $\frac{3}{8}$ " or  $\frac{1}{2}$ " supply connections. Foot or hand control. Automatic or manual. With or without the MARTON Combination Regulator, Gauge, Lubricator and Strainer • Write for catalog of the complete Lehigh-MARTON line. *Marton Air-Valve Division.*

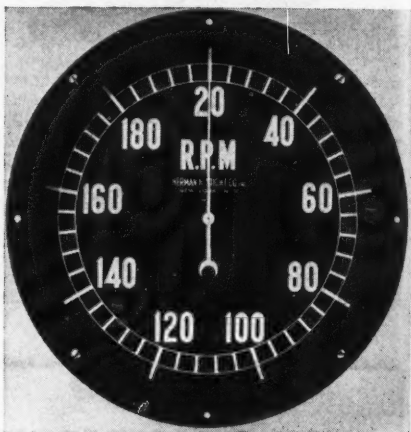
**LEHIGH FOUNDRIES, Inc., EASTON, PA.**  
New England Rep. **MARTON EQUIP. CO.**  
145 Cabot St., Beverly, Mass.



### Lehigh-MARTON AIR-CONTROL EQUIPMENT

per hour, or any other special operations, the tachometer can be obtained with an 8, 10, or 20-inch dial having figures as large as 1,  $1\frac{1}{4}$ , or  $1\frac{1}{2}$  inches.

The Model SX is a centrifugal tachometer which is said to quickly and accurately reflect the actual running speed or rate of output of any machine. Being of centrifugal design, it is non-magnetic, unaffected by temperature variations, and operates independent of direction of rotation, the manufacturer states. The movement of the tachometer is built into a water-tight brass case, and the outlet



Sticht Model SX Stationary Tachometer

for a flexible shaft can be located at any desired position either straight down or sideways at any degree.

According to the manufacturer, the Model SX is a heavy duty tachometer which can be operated continuously for thousands of hours without any special attention. All working parts are located on ball bearings and are said to require lubrication only every 500 hours. The tachometer is driven by a flexible shaft which terminates in a special pinion bracket that is driven by the tachometer drive gear usually attached to the proper shaft of the machine to be indicated.

#### "Presto" Improved Contact Wheel

Cool-running qualities, which permit use on semi-automatic polishing lathes, are among the improvements claimed for a newly developed contact wheel an-

nounced by The Manderscheid Co., 810 Fulton St., Chicago 7, Ill., as an addition to its line of "Presto" products. Five plies of cool-running rayon cord, such as used for truck tires, make the wheel suitable for semi-automatics by keeping it cool and holding its shape, the manufacturer states. Holes through the rubber provide for additional cooling beneath the surface and produce the action



"Presto" Improved Contact Wheel

which snaps the abrasive belt as it leaves the work, beating it clean with 72 hammer blows per revolution of the 14-inch wheel.

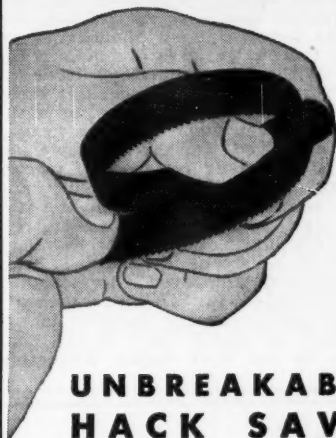
The Presto Improved Contact Wheel is available in 9 and 14-inch diameters and in 2, 3, and 4-inch face widths. According to the manufacturer, diameters are precisely uniform so that two or more wheels can be used together to produce any desired face width.

#### Richards Improved Thermocouple

Supplied with either a No. 8 gauge standard chrome Alumel or iron constantan element, a thermocouple of improved design which can be used with any make of pyrometer is now being marketed by the Arklay S. Richards Co., Inc., 80 Winchester St., Newton Highlands 61, Mass. Close temperature control is obtained by the use of a 7/8-inch O.D. heavy seamless drawn Inconel protecting tube which fits the thermocouple element closely for maximum sensitivity of response. Long life is said to be assured by the unusually heavy wall thickness

## Spartan METAL CUTTING SAWS

### FLEXARD



### UNBREAKABLE HACK SAWS

Spartan Flexard Hand Hack Saw Blades are ideal for use in repair and maintenance work, for they will not break in use and yet they will out-cut ordinary standard blades 3 to 1.

Buy Spartans—ask your distributor today!

**SPARTAN SAW WORKS**  
INCORPORATED  
**SPRINGFIELD 7, MASS.**



Richards Improved Thermocouple

(0.147 inch) of the protecting tube, and the 80 per cent nickel, 13 per cent chromium high grade ductile alloy is claimed to eliminate porosity and mechanical breakage.

Minimum time is said to be required for inspection and assembly of the unit since the terminal head is designed so that the thermocouple can be quickly inspected without disconnecting leads or using a screw driver. Thermocouple wires can be inserted into the connector without bending even when two-hole insulators are employed. The thermocouple element may be easily replaced by merely loosening two screws. The high grade ceramic connector body is said to withstand high temperatures indefinitely, thereby eliminating frequent renewal of the part on severe applications.

The Richards Improved Thermocouple is recommended for all general heat-treating service except sulphurous atmospheres, in which case 25 per cent chrome, 20 per cent nickel protecting

tubes should be specified. The thermocouple is available in standard lengths from 12 to 48 inches inclusive in multiples of 6 inches and from 60 to 144 inches inclusive in steps of 12 inches.

### Helical Spiral End Mill

An end mill with progressive spiral taper is now being produced by the Helical Cutter Co., 15536 Telegraph Rd., De-



Helical Spiral End Mill

troit 23, Mich. According to the manufacturer, the progressive spiral of the cutter enables it to shear evenly throughout the length of the cutting edge and thus cut

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REIFF & NESTOR COMPANY

**NU-TRIX**

THREAD RESTORER

For Fixing Battered Threads

U. S. Patent No. 1694229

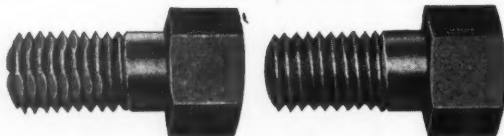


### 8 Popular Threads in the Tool

No. 1—Nu-Trix for 11, 12, 13, 14, 16, 18, 20, 24 Threads to the Inch.

No. 2—Nu-Trix for 9, 10, 15, 16, 20, 26, 28, 32 Threads to the Inch.

Use it like a regular file on bolts, and threaded shafts.



▲ BEFORE USING NU-TRIX ▲ AFTER USING NU-TRIX

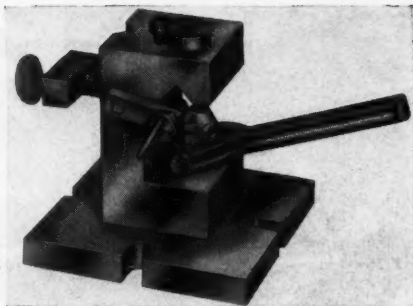
**Reiff & Nestor Co.**

Lykens, Pa.

Tel. Lykens 33

fast and free with minimum tendency to dull. The end mill is designed to maintain an approximately constant helical angle through the cutting edge and is said to have the same shearing and cutting action at all stages of dulling.

The Helical Spiral End Mill, which can be easily faced and sharpened, is claimed to be ideal for all machine shops and to be especially suited for pattern work. Made of selected high speed tool steel with flutes polished out so as to eliminate excessive loading of the flutes by non-ferrous metals, the end mill includes four right-hand flutes and is available in sizes with 1 to 6-inch flutes having 1 to 3-deg. tapers.



Matco Universal Drill Jig

### Matco Universal Drill Jig

A unique all-purpose drill jig designed to reduce downtime to an absolute minimum is announced by the Matco Tool Co., 2830 W. Lake St., Chicago 12, Ill. Mounted on a 4 x 4 x 1/2-inch removable base, the jig measures 3 3/4 inches high. Using a thumbscrew for a positive stop and an adjustable ground anvil for a locating base, holes ranging up to 1/8 inch in diameter can be accurately drilled and dupli-

cated in stock up to 3/4 inch O.D. A cam-action handle is used for quick locking of the work. On an opposite V-groove in the anvil, material up to 1 inch in diameter can be accommodated.

According to the manufacturer, the Matco Universal Drill Jig can be quickly and easily adapted to various other needs. By detaching the base and laying it on the flat side, the accurate back V-block is said to make it an ideal grinding fixture.

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DRILL HEAD**

Adaptable to 14" x 17" Machines  
6" Drilling Area

HEAD CAN BE FURNISHED WITH 3 TO 8 SPINDLES

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3 Spindle Head	\$150.00	6 Spindle Head	\$170.00
4 " "	155.00	7 " "	180.00
5 " "	160.00	8 " "	200.00



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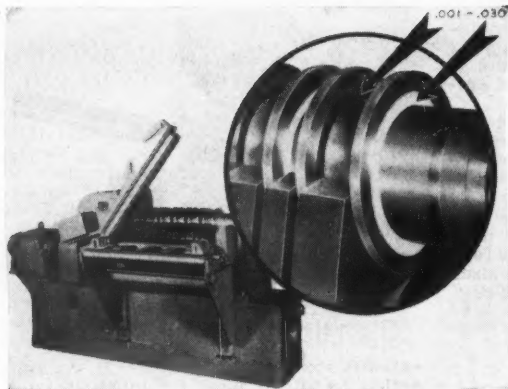


Illustration Showing Applications of Artus Slitting Machine Spacers

in sizes up to 20 inches in diameter, each thickness of spacer being of different color to provide for easy identification.

### Lincoln Shield-Arc LH-70 Electrode

An electrode which is said to greatly simplify the welding of high sulphur, free-machining steel and of certain high tensile, low-alloy steels is announced by

The Lincoln Electric Co., Cleveland 1, Ohio. The electrode, which is known as the Shield-Arc LH-70, has a low-hydrogen, low-moisture coating and is designed for use with d.c. polarity, since the welded tensile properties are 70,000 to 80,000 tensile strength and elongation is 25 to 30 per cent. The range is:  $\frac{1}{8}$ -inch, 100 to 135 amperes;  $\frac{3}{16}$ -inch, 140 to 190

### Artus Slitting Machine Spacer

Industrial Products Suppliers, 108 Water St., New York 5, N. Y., announces the addition of a slitting machine spacer to its Artus line of plastic arbor spacers and shim stock.

Designed to eliminate time lost through producing makeshift spacers by hand, the Artus Slitting Machine Spacer is available

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Also mfrs. of Bobbins, Coil Forms, Dielectric Paper Tubes  
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amperes; and  $\frac{1}{8}$ -inch, 180 to 250 amperes.

With the electrode, preheating of high-tensile, low-alloy steels can be eliminated or largely reduced; welds of exceptional toughness can be made on high carbon and other steels which tend to show underbead cracking when welded; welding of high-silicon electrical sheet steel is highly practicable, and high sulphur steels can be welded as readily as low sulphur mild steel, the manufacturer claims. In using the electrode, vertical welds are made from bottom up. Overhead welds may be made with a narrow lateral weave. The  $\frac{1}{8}$ -inch and  $\frac{1}{4}$ -inch sizes are suitable for vertical and overhead welding and for large welds in thick plate, while the  $\frac{1}{8}$ -inch size may be used for vertical and overhead welds.

The electrode is supplied packed in 50-lb. containers in sizes of  $\frac{1}{8}$ ,  $\frac{1}{4}$ , and  $\frac{1}{2}$  inch in diameter x 14 inches in length.

### OK Interchangeable Adjustable Tungsten Carbide Tool

An interchangeable adjustable serrated tungsten carbide tool which is designed to reduce carbide breakage to a minimum due to the method employed in



OK Interchangeable Adjustable Tungsten Carbide Tool

mounting the carbide tip is announced by The O. K. Tool Co., Shelton, Conn. The unit includes a holder and six readily interchangeable tool bits; namely, a right and left-hand boring tool bit, right and left-hand turning tool bit, and right and left-hand facing tool bit.

The holder is available in five sizes of  $\frac{1}{8}$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $1\frac{1}{4}$ , and  $1\frac{1}{2}$  inches square, and is constructed to permit easy handling at the machine, grinder, and tool crib. Available in five different sizes, each tool bit is readily adjustable, with the carbide tip being located in the direction of wear so as to reduce bit replacement to a minimum.

# INTERCHANGEABILITY

Your KEY to  
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Will Speed up Drilling  
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**ACCURATE BUSHING COMPANY, 440 North Ave.; GARWOOD, N. J.**

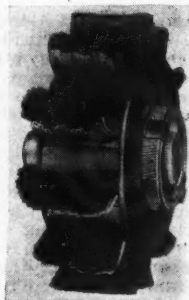
WEstfield  
2-2415

## Sand-O-Flex Model 650C Contour Sander

Designed for use in finishing and sanding irregular surfaces or edges, a heavy duty model of its contour sander, designated as the 650C, is announced by the Sand-O-Flex Corp., 4373 Melrose Ave., Los Angeles 27, Calif. The sander, which can be used on practically any rotating shaft, has 12 brush-backed abrasive strips which are fed out as needed from an internal cartridge. As the unit is rotated, these strips are forced into, around, and over the surface or contour.

The Sand-O-Flex Model 650C can be

used for sanding and finishing operations, for "satin" finishing, for removing rust, scale, and toolmarks, and for deglossing. The unit has a 6 $\frac{1}{8}$ -inch housing and 10 $\frac{1}{4}$ -inch overall diameter, including height of brushes. The abrasive strips are 2 $\frac{1}{2}$  inches wide, and refills are available in various grits and grades, scored or unscored, in aluminum oxide and garnet cloth. Fully loaded, the unit weighs 7 $\frac{1}{2}$  lb. The design includes a  $\frac{3}{4}$ -inch bore which enables the sander to be mounted on a right or left-hand shaft of a buffing and polishing lathe, electric motor, drill press, flexible shaft equipment, or wood or metal-working lathe, as well as a mandrel.



Sand-O-Flex Model 650C Contour Sander

## High Speed Cutting Tools

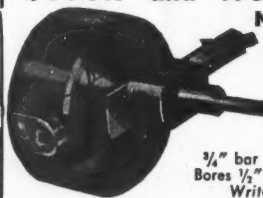
- Special high speed circular, dovetail, flat form and special tool bits.
- Design and manufacture of small machines, jigs, gages and experimental parts.
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Write for quotes.

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### No. 35 FLYNN

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OFFSET  
BORING HEAD  
HAS RIGIDITY  
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Large Range  
2" OFFSET

$\frac{3}{4}$ " bar or tool capacity.  
Bores  $\frac{1}{2}$ " to 12" dia. holes.  
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**FLYNN MANUFACTURING CO.**  
437 Bates St. Detroit, Mich.

## "Simometer" Saw Tension Measuring Device

Haphazard methods of testing the tension of power hack saw blades are claimed to be eliminated through the use of a unique device, known as the "Simometer," developed by the Simonds Saw and Steel Co., Fitchburg, Mass. According to the manufacturer, the device can be quickly and easily applied to any blade regardless of length, width, or thickness, and is designed to accurately measure applied tension and indicate the correct amount for maximum cutting efficiency.

Attached directly to the blade to be

## DYKEM STEEL BLUE

**Stops Losses in Making Dies and Templates**

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy. Write for full information.

### THE DYKEM COMPANY

2301F NORTH 11th ST.

ST. LOUIS, MO.

(In Canada: 2466 Dundas St. West, Toronto, Ont.)

tested, the Simometer is held in place by two thumbscrews. As tension is applied, a pointer on a simplified, easy-to-read dial indicates the correct tension, predetermined by exhaustive tests. When the proper tension has been reached, the Simometer can be quickly removed from the blade. By measuring the actual tension or stretch of the blade itself, the



"Simometer" Saw Tension Measuring Device

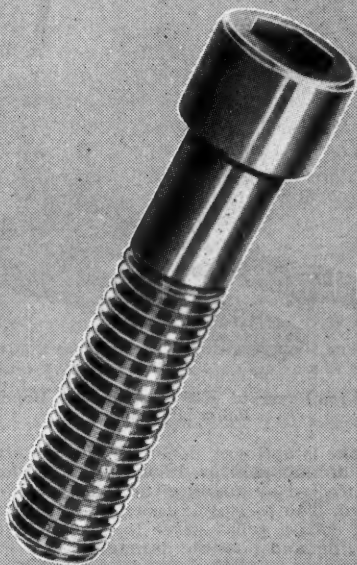
device is claimed to avoid inaccuracies due to blade holder friction or variations in the pitch or threads in the tightening devices.

The Simometer is supplied packed in a convenient protective wooden box for shop use.

### Lyon-Raymond 2000-Lb. Capacity Hand Pallet Lift Truck

A lightweight hand pallet lift truck of 2,000-lb. capacity is now being offered by the Lyon-Raymond Corp., 3238 Madison St., Greene, N.Y. The working parts of the unit are totally enclosed so as to protect them as well as to give the truck a streamline appearance. The use of high strength alloy sheet steel formed into box sections for the frame and aluminum alloy for wheels and other non-structural parts ensures a minimum of weight.

Elevation of the load is accomplished through a hydraulic foot pump especially designed for the truck. The length of the



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You can depend upon Brighton for quick delivery of all stock sizes; also prompt shipment of special orders. New facilities and new methods of volume manufacture make BRIGHTON Socket Screw Products

uniformly excellent . . . unsurpassed for dependability.



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**THE BRIGHTON SCREW & MFG. CO.**  
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Lyon-Raymond 2000-Lb. Capacity Hand Pallet Lift Truck

stroke is optional, depending on the stature of the operator. Lowering of the load is effected by pushing the foot pedal forward. The hydraulic foot pump is equipped with a relief valve to prevent overloading and possible damage.

### "Malcomizing" Process

"Malcomizing," a process for surface hardening steels, is announced by The Chapman Valve Manufacturing Co., Indian Orchard, Mass. The process, it is claimed, takes advantage of the chromium in the various grades of stainless as the hardening element, thus forming a hard wear-resistant surface without seriously affecting the corrosion resisting characteristics of the steel. Dimensional changes due to treatment are said to be kept at a minimum due to the low temperature used in the treatment.

Malcomized stainless steel is claimed to show a minimum hardness of 92 Superficial Rockwell, 15 N scale, which corresponds to a Vickers hardness of 820 Brihrell. The depth of the case produced varies with the type of stainless steel used. The corrosion resistant properties of Malcomized parts are said to compare favorably with those of untreated parts. Due to the metallurgical nature of the surface hardened layer, it is not resistant to attack by halogen acids or salts nor by any corrosive conditions which will attack the original alloy.

The Malcomizing operation produces a slight change in the dimensions of the parts treated, which is said to be predictable to within close limits and to be con-



Fig. 2197

### THIS **HALLOWELL** FOREMAN'S DESK OF STEEL IS A TIME-SAVER

Of stand-up height it can be used to advantage throughout your shop . . . and it's a time-saver because it enables your foreman to keep his cards, records and other information in a convenient place, always at his finger tips for ready reference.

This "Hallowell" Foreman's Desk of Steel is sturdy and hard wearing . . . has a box flanged top with smooth writing surface of just the right slant. Many other styles available.

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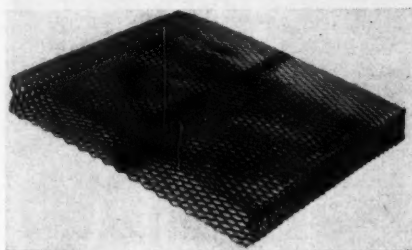
stant for each furnace charge of identical parts. After the material has been Malcomized, its physical characteristics as regards tensile and yield strengths, elongation, reduction of area, and impact value remain approximately the same as in the original material, with the exception that the surface hardness is said to be greatly increased up to approximately 1,000 Vickers Brinell. Where desirable, because of subsequent machining or assembling operations, sections of Malcomized parts can be left soft by the use of certain stop-off materials.

### Phillips Expanded Metal Pallet

An Expanded Metal Loading Pallet in which light weight has been combined with tough serviceability has been designed by Phillips Mine & Mill Supply Company, 158 Jane Street, Pittsburgh 3, Pennsylvania.

The expanded Metal process provides a lightweight pallet with sufficient deck friction to effectively hold loads. The new Pallet is constructed of 13 gauge material with  $\frac{1}{4}$ -inch openings and will accommodate approximately 3000 lb. of load, regardless of size.

Phillips Mine and Mill Supply Company have also added a new Wood Deck Steel-Bound Phil-Pallet to their pallet line in



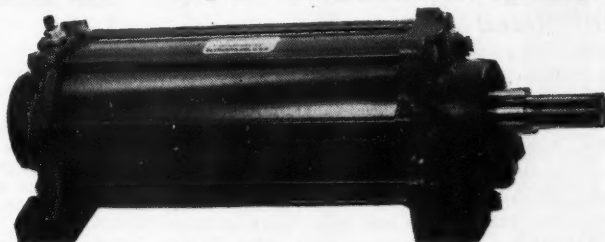
Phillips Expanded Metal Pallet

response to numerous requests for such a product. Both of the new pallets are now available to industrial users.

### "Rimat" Inside Micrometer

Known as the "Rimat," an inside micrometer of the direct-reading type is announced by the Richards Machine Tool

## AIR CYLINDERS

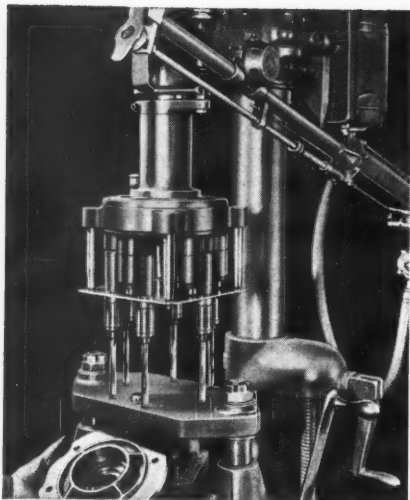


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**The Quick-Change Adjustable, Multiple Drill Head** is designed for long-run, multiple drilling and tapping operations. Illustration shows six holes for a bolt circle being drilled in a cast iron bearing plate. Six different bearing plates are drilled with this head at Wisconsin Motor Corp.

Each bolt circle pattern has its own set of spindle positioning plates. Spindle locked into position; cannot shift. Each spindle can be located anywhere within a 3 1/4" circle, and all circles overlap.

Standard models available with 2 to 6 spindles. Models with more than six spindles built to order.

Write for Illustrated Bulletin

**STRUTZ & MEAD, Inc.**  
DISTRIBUTORS FOR  
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Co., 124 S. Isabel St., Glendale 5, Calif. The tool is claimed to be particularly useful when machining the back of a flange or boring recesses that must be kept to close limits. In such instances, the micrometer can be inserted, the measurement taken, the measuring pins retracted, and the tool withdrawn.

The ends of the measuring pins of the Rimat Micrometer are "hardened and



"Rimat" Inside Micrometer

ground on a radius for accuracy and to prevent cramping. All wearing surfaces of the tool are hardened and ground, and means are provided so that all wearing surfaces can be readily adjusted if necessary. All graduations on the micrometer are clearly cut for easy reading. The head of the tool has a blue-black finish, while other parts are provided with a bright finish.

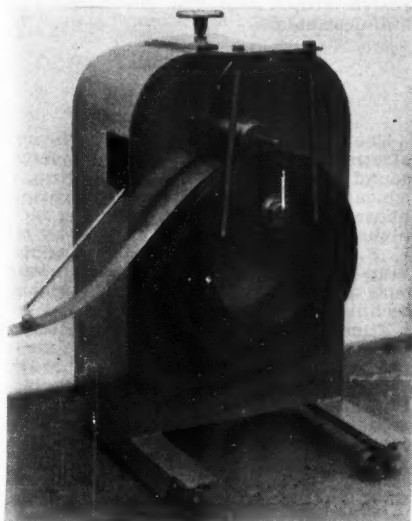
The Rimat Inside Micrometer has a range of 1 inch and is available in two sizes; namely, 3 to 4-inch size with extra measuring rods up to 6 inches, and 6-inch size with extra measuring rods up to 12 inches. Special sizes can be obtained on order.

## Hummm Motorized Coil Feeding Device

Featuring ease of loading, a motorized coil feeding device for feeding strip steel to power presses is now being marketed



by the John Humm Safety Equipment Co., 253 Sheffield Ave., Brooklyn 7, N. Y. Said to require no tools or wrenches for adjustment, the device is portable and may be plugged into any light circuit. It is designed to accommodate coils up to 12 inches wide and has a maximum capacity of 500 pounds.



Humm Motorized Coil Feeding Device

According to the manufacturer, the Humm Motorized Coil Feeding Device is arranged to start automatically when slack in the strip steel is taken up by the press and to stop automatically when the slack is increased.

### J. & S. Spiral Form Tool Grinding Service

Using equipment designed exclusively by the company's own engineers, the J. & S. Tool Co., East Orange, N. J., form grinds spiral form tools and spiral fluted form drills to customer specifications. The grinding technique employed is the outgrowth of years of concentrated experience in form-grinding operations.

Spiral form tools ground by the company are claimed to feature unusually long life together with strength and free-cutting qualities.

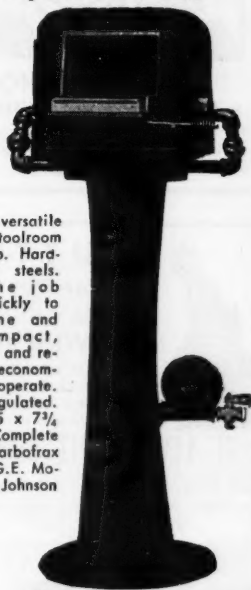
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## New Films

### Steel Melting Film

The vivid changes occurring in steel during a heat within the walls of an electric arc furnace are shown in actual colors in a 15-minute film entitled "Melting of Huron Die Steel," now available from the Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh, Pa. Slag covering the molten steel is first shown, followed by shots of the true color of the steel itself as the slag is broken apart. Animated diagrams describe the melting

process from the moment the scrap is placed in the furnace until the pure stainless steel is poured into the ladle.

"Melting of Huron Die Steel" is available free of charge for technical and lay audiences. Another new Allegheny Ludlum film also available for free showing is entitled "Corrosion" and contains an explanation of the mechanism of corrosive attack and the development of stainless steels.

### Broaching Films

The Broaching Film Institute is now offering three 16 mm. motion picture sound films to manufacturers desiring to educate their employees on the various phases of broaching and broaching technique. Produced during the war by the U. S. Office of Education, these training films are also available for use in various technical society meetings and in technical schools.

Film No. 1, "Broaching an Internal Keyway," covers the important points of internal broaching such as: what internal broaching is; how the broaching tool cuts; principles of broaching tool design; selecting the broaching tool for the job; and how to operate the internal broaching machine.

Film No. 2, "Single Ram Vertical Surface Broaching," covers: the parts of a single ram vertical broaching machine; interpreting the blueprints of a broaching tool; installing broaching inserts for straddle broaching; mounting the toolholder with its assembled broaching tool; mounting and adjusting the work fixture; and how to surface broach at a production rate.

Film No. 3, "Double Ram Vertical Surface Broaching," covers: assembling broaching inserts in right and left-hand toolholders; mounting and adjusting toolholders in the double ram; mounting and



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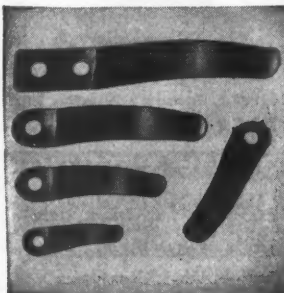
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Tool and die shops, press rooms, machine shops, etc., will find these handy neat looking springs the answer to their flat spring requirements. They cost but a fraction of hand made springs. Made in four lengths from 1" to 2 1/4" and eight thicknesses from .010 to .032.

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adjusting work fixtures; setting up trip dogs for the ram stroke; measuring the workpiece after trial broaching; and how to surface broach on a double-ram vertical broaching machine at a production rate.

Any manufacturer, technical society, or technical school can arrange for the use of these films without charge by writing to the Broaching Tool Institute, 74 Trinity Place, New York 6, New York.

### Industrial Films

Castle Films, authorized distributor of U. S. Government visual aids, announces the release of many new films for school and industrial training purposes. There are now available 730 sound motion pictures on 16 mm. film and 585 filmstrips for 35 mm. slidefilm projectors to aid in teaching a wide variety of skills from nursing to shipbuilding, with many films dealing with engineering and scientific subjects.

Educational authorities credit many of these Government films with doing an outstanding job in training men for war work in factories and all have a permanent value in classrooms and industrial training departments. Visual and tech-

nical specialists planned and supervised the productions in which complete series are unique in presenting a step-by-step approach to a job, each film graduated in difficulty.

The visual aids were produced by the U. S. Department of Agriculture, U. S. Office of Education, U. S. Navy and War Departments, U. S. Public Health Service, Civil Aeronautics Administration, and Veterans Administration. Complete information on the films is available from the Castle Films Division, United World Films, Inc., 30 Rockefeller Plaza, New York 20, New York.

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**MODEL A**—A 3-way valve, actuated by some motion from the machine to which the table is to be synchronized, allows compressed air to move a hardened and lapped piston to operate the Pawl arm. The Pawl indexes the plate and LOCKS it in the indexed position until the valve is released allowing a spring to return the Pawl, ready for the next indexing.

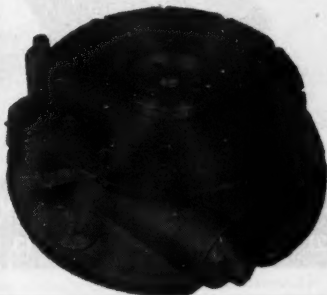
**MODEL B**—This model is an adaptation of Model A wherein a special control valve is incorporated so that the plate is automatically self-indexing. By merely turning a screw, speed is adjustable from one indexing each half second to one each ten seconds. The table is locked in position between indexings. Recommended for soldering, assembly, etc., operations where no mechanical motion is available.

\*F.O.B. Brooklyn, New York

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Height from base to top of Index Plate—2 1/4".  
Standard 12-position Index Plate.  
All working parts hardened.

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## Processing Film

The processing of refrigerator compressor housings with a Greenlee 24-Station Automatic Transfer Processing Machine is shown in a 16 mm. sound film now being made available to interested groups by Greenlee Bros. & Co., Rockford, Ill. Produced in the company's plant, this 12-minute film demonstrates a method of reducing work handling in the mass production of important peacetime products with the transfer machine. Cycle time and other interesting production facts are given, thereby affording an idea of the potential savings on similar applications.

The film depicts the 31 different machining operations performed by the 98½-foot machine, with many close-ups provided showing individual heads, tooling, clamping features, and transfer mechanisms. The film may be obtained on a loan basis by writing directly to the company. Requests should state the size of the audience that will view the film and the length of time it will be necessary to retain the film.

## Surface Broaching Film

The Lapointe Machine Tool Company, manufacturer of broaches and broaching machines, has completed a colored sound film entitled "Surface Broaching." Running approximately 17 to 18 minutes, this 16 mm. film provides a graphic demonstration of how effectively surface broaching is accelerating the production of many everyday products, including loom frame ends, flat iron bases, automobile bearings, wrenches, pliers, and automobile cylinder blocks.

The handling of a problem concerning cylinder blocks is interestingly shown. The film also demonstrates how surface broaching adapts itself to meet the many diversified demands made upon the machine industry today, and it very clearly



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shows the important role which broaching plays in modern machining. Many of the scenes were taken on the job in several of the country's finest industrial plants.

The film is available for exhibition to interested groups and may be accompanied by an address on broaching by Lapointe's chief engineer, Kenneth N. Macomber. Complete information is available by writing to Dept. W-58, Lapointe Machine Tool Co., Hudson, Mass.

## New Books

**National Fire Codes Vol. V; National Electrical Code, 1947 Edition.** Published by National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass. 408 pages, 6 x 9 inches. Red cloth binding with gold lettering. Price, \$2.00.

This edition of the National Electrical Code is a collection of rules governing the installation, and to a certain extent, the use of electrical equipment. Its purpose is to reduce the hazard from electrical fires and electrical accidents by specifying the exact manner in which electrical materials, devices, fittings, and appliances should be both originally installed and later maintained.

Presented for the first time in convenient desk reference size (6 x 9 inches), the volume is uniform in size and format with the other four volumes of the National Fire Codes also published by the NFPA. Attractively bound in red cloth with gold lettering, the Code contains examples, an index of all NFPA publications relating to various sections of the Code, and an advertising section of "approved" products. The volume is said to be unique in engineering reference books in that the type is extremely easy to read and the book is bound so that it remains flat when open for easy reference.

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Co., 211 South 2nd St.



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"The Silent Salesman." To help demonstrate its new Dual Drive lathe, The R. K. LeBlond Machine Tool Company has released a 16-page booklet which is being designated as "The Silent Salesman." In addition to its many other virtues, the booklet is designed to enable the prospective lathe buyer to examine the product inside and out without even getting out of his chair.

The booklet is printed by a process which permits the reader to disassemble and assemble the Dual Drive lathe piece by piece right on his desk. The new technique used in "The Silent Salesman" vir-

tually X-rays the lathe in three dimensions and thereby presents an unusually sharp conception of lathe design, construction, and maintenance. Five colors are used to display the dual driving mechanisms, feed drive, cut sections, and oil lines, and descriptive text matter is keyed to the illustrations.

"The Silent Salesman" is now being shown by LeBlond distributors all over the world, and may be seen on request at the nearest distributor. Those desiring a personal copy may obtain same by addressing a request, accompanied by \$1.00, to The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. The booklet also has an important application in the education field and is being offered to industrial apprentice schools, colleges, universities, and vocational schools at \$1.00 per copy.

Trade-Mark Act of 1946. By H. A. Toulmin, Jr. Published by W. H. Anderson Co., 524 Main St., Cincinnati, Ohio. Price, \$5.00 per single copy; ten or more copies, \$4.00 each.

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the patent committees of various bar associations, the new trade-mark act, known as the Lanham Act, comprising the subject of this book is said to be the first comprehensive law enacted for the protection of trade marks in the United States. The author of the book is a well-known authority on trade-mark law, and is the writer of previous trade-mark books and articles, as well as counsel for a large number of corporations on trade-mark matters. He is a member of the law firm of Toulmin & Toulmin of Dayton, Ohio, and Washington.

According to the book, under the new law many types of trade marks which could not be successfully protected are now susceptible of protection, such as secondary meaning marks, service marks, certification marks, and distinctive package designs. Another unique feature of the trade-mark law, as indicated in the book, is the provision for separate registers. In addition to the principal and supplemental registers, the Commissioner of Patents may establish separate registers for foreign marks, service marks, and collective and certification marks.

As discussed in the book, one of the most vital advantages of the new trade-mark law is that after a period of years a mark becomes incontestable and is the property without question of the owner. Heretofore, the registration of a trade mark was only evidence of a claim to the mark. New grounds for cancellation are if the mark becomes the common descriptive name of a product or if the mark is being used to violate the anti-trust laws.

**Job Evaluation and Employee Rating.**  
By Richard C. Symth and Matthew J. Murphy. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 255 pages, 5 $\frac{1}{2}$  x 8 $\frac{3}{4}$  inches.



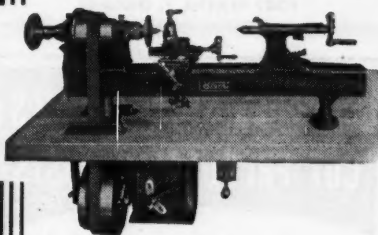
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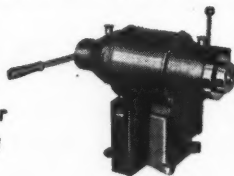
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15 figures. Cloth binding, board covers. Price, \$2.75.

This book analyzes the various methods of job evaluation—ranking and grading methods and so on—and the various types of merit rating plans. It then describes a clearcut method whereby each worker will be compensated equitably, presenting a specific program point by point as it may actually be installed in the reader's plant. Full consideration is made for the attitude of labor organizations and the various aspects of legislation, collective bargaining, and internal relationships to be taken into account.

The contents of the book are divided into two principal parts headed "Job Evaluation" and "Merit Rating." Under Part I and 11 chapters headed as follows: Purpose and Significance; Ranking and Grading Methods of Job Evaluating; Factor-Comparison Method and Job Evaluation; Point Method of Job Evaluation; Comparison of Job-Evaluation Systems; Job Descriptions; Installing and Maintaining the Job-Evaluation Plan; Employee Classification; Labor-Market Wage Survey; Determining the Wage Scale; and Basic Wage Administration Policies.

Part II includes the following five chapter headings: Introduction to Merit Rating; Types of Merit-Rating Plan; Some Statistical and Psychological Problems in Rating; Developing the Merit-Rating Plan; and Administering the Merit-Rating Plan.

**The Federal Labor Laws.** Second edition. Published by National Foremen's Institute, Inc., 10 High St., Deep River, Conn. 100 pages, 6½ x 9½ inches. Loose-leaf binding, fabrikoid cover. Price, \$2.50.

In this compact manual, the supervisor or foreman can find simple answers to hundreds of difficult questions regarding Federal laws on labor and social security. In legal terms, the manual explains the



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most important aspects of the following laws and subjects: The Wagner Act; the Wage and Hour Law; the Walsh-Healey Public Contracts Act; Unemployment Compensation and Old Age and Survivors Insurance; the Employment Service (now returned from Federal to state control); the GI Bill of Rights; Veterans Reemployment and Seniority Rights; the Fair Employment Practices Committee (now defunct but with a strong chance of revival); the Railway Labor Act; the Railroad Retirement and Railroad Unemployment Compensation Acts.

This edition includes all Congressional amendments to date, together with revisions based on new agency regulations or caused by major court rulings. The railroad laws, which also apply to airlines and express companies, are important new features of the book. The chapters on the Railroad Retirement and Unemployment Compensation Acts, which cover more than 2,000,000 workers, provide complete explanation of these laws.

As a loose-leaf manual, "The Federal Labor Laws" can be kept up to date with the insertion of supplements and substitute pages. These will be prepared by the Institute and sent to owners of the book when important changes are made.

**Resistance Welding Manual.** Revised edition. Published by Resistance Welder Manufacturers' Association, 505 Arch St., Philadelphia 6, Pa. 552 pages, 6 x 9 inches. Cloth bound. Price, \$3.00 postpaid.

Revisions in this manual of the resistance welding processes have practically doubled the size of the volume compared with the first edition, thus making the present edition a much more complete treatise. Twenty entirely new chapters have been added. The tables of recommended procedures have been revised to

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**CRATEX MANUFACTURING CO., 97 Natoma St., San Francisco, Calif.**

bring them up to date with respect to present-day practice. Numerous additions, based upon research and experimental work conducted during the war production period, furnish operating data on materials not covered in the previous editions.

In the section dealing with resistance welding procedures, each group of metals is treated in a separate chapter. The general plan of each of these chapters is a discussion of the resistance welding properties of the subject material, followed by explanations of the relative importance of the various operating variables and schedules of recommended welding conditions. Mechanical and electrical characteristics of both conventional a.c. and stored energy systems are treated in detail, with large additions to the discussions of electrical controls and power supply.

A new section contains chapters on quality control, standard tests, and instrumentation. In addition to outlining test specimen requirements for the various standard tests, the book includes a supplementary discussion on the common fields of application for the different methods of testing. Among other important contributions to this edition is a chapter on recommended maintenance

practices for resistance welding machines, a glossary of the latest approved definitions used in the industry, and a collection of useful tables.

**Information Sources for Small Businesses.** By James C. Yocum, assisted by Emma Ferrin. Published by Bureau of Business Research, College of Commerce and Administration, The Ohio State University, Columbus 10, Ohio. 59 pages. Heavy paper covers. Price, \$25.

This volume is one of the first of a series of Ohio Small Business Handbooks which is being prepared by the Bureau of Business Research of The Ohio State University. This handbook series is being developed in cooperation with the Ohio Small Business Commission as a means of giving assistance to small businesses.

The present publication is an annotated index of principal sources of information on the variety of problems involved in establishing and operating a small business. It is intended to encourage the study of better management procedures and to make it easy for operators of small businesses to obtain helpful information on particular problems encountered in their businesses.



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Side Milling Cutter.**

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## New Shop Literature

**Snow Air Tool.** A folder containing illustrations, descriptions, and general specifications of an air-operated electrically controlled automatic machine tool for threading, drilling, and tapping operations is now being distributed by The Snow Manufacturing Co., 615 S. California Ave., Chicago, Ill. Separate bulletins on the various models and designs in which the machine is available, as well as specification leaflets, are included in the folder, copy of which is available free upon request.

**"Grip-Slide Threading and Tapping Tools** for use in centering and small diameter drilling and reaming operations on lathes, for chasing (sizing) threads on turret lathes, and a variety of other internal and external threading and tapping jobs are illustrated and described in a six-page folder published by The Thread Miller Corp., 17 E. 42nd St., New York 17, N. Y. Copy free upon request.

**Schrillo Tap Catalog No. 14.** To acquaint all tap users with its products, the Schrillo Aero Tool Engineering Co., 8715 Melrose Ave., Los Angeles 46, Calif., has prepared a 156-page, metal-ring bound leatherette-covered catalog presenting illustrated, descriptive, and tabular information, including sizes and prices, on serial hand taps, standard hand taps, three-fluted hand taps, spiral-pointed hand taps, standard machine screw taps, spiral-pointed machine screw taps, nut taps, straight shank tapper taps, bent shank tapper taps, pulley taps, taper pipe taps, straight pipe taps, special taps, and Acme taps. The catalog also includes a section containing tap and thread terms, general tapping information, tapping suggestions, tapping speed tables, data on three-wire measurement of pitch diameter of screw threads, National Screw Thread Commission Standards, and so on. Moreover, the catalog presents illustrated, descriptive, and tabular information on a variety of countersinks, counterbores, pilots, spotfacers, burring reamers, angle drives, thread ring gages, cylindrical plug gages, and other tools.

Copy of Catalog No. 14 is available to purchasers, users, and designers of taps and tapping equipment addressing requests on their company letterheads.



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577 Madison St.,

Greene, N. Y.



**AristoCraft Power Tools.** Aristo Power Tools, Inc., 601 W. Washington Blvd., Chicago 6, Ill., has published a 36-page catalog which fully illustrates and describes its line of AristoCraft power tools, including drills, jigger saws, bench grinders, pedestal grinders, carbide tool grinders, buffers and polishers, hydraulic presses, flexible shaft equipment, power discs, brushes, air guns, power saw blades, blowers, and so on. The facilities of the company for performing the various operations in the construction of the above mentioned tools are also illustrated and discussed in the catalog, copy of which is available free to mechanical executives addressing requests on their company letterheads.

**"Standard" Metal Processing Machinery.** The Standard Machinery Co., Providence 7, R. I., now has available a 12-page general catalog illustrating and describing Hydro-Formers, swaging machines, drop hammers, draw benches and wire drawing machines, Turks Heads, power presses, rolling mills, welding positioners, mechanical transmissions, and fluid drives. Copy of Catalog No. 145 free upon request.

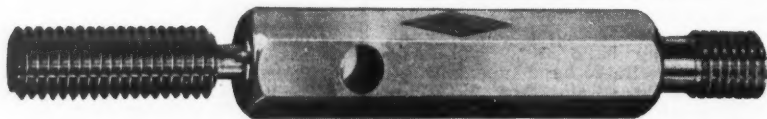
**"Fifty Years of Progress"** is the title of a 48-page cloth-bound book published by The Fellows Gear Shaper Co., Springfield, Vt., tracing the history of the company from its establishment in 1896 up through 1946. Beginning with a discussion of the late Edwin R. Fellows, founder and second president of the company, the book then presents brief biographies of the various executives of the firm. Following this is a complete history of The Fellows Gear Shaper Company and illustrations, together with brief descriptions, of the various gear-producing equipment manufactured by the company over the last 50 years. Moreover, the book incorporates a section on Fellows veterans, as well as an honor roll of its men who have served in World War II.

Copy of the book can be obtained by interested executives addressing requests on their company letterheads.

**Walker Chucks.** The O. S. Walker Co., Inc., Worcester 6, Mass., now has available a 20-page catalog and price list of rectangular, swiveling, rotary, and special type electromagnetic chucks, demagnetizers, and planer parallels. Copy of Catalog and Price List WPL-47 free.

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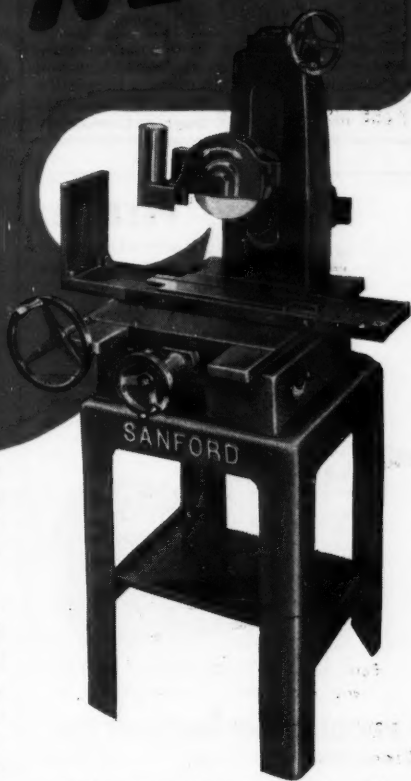
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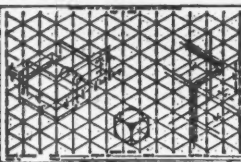
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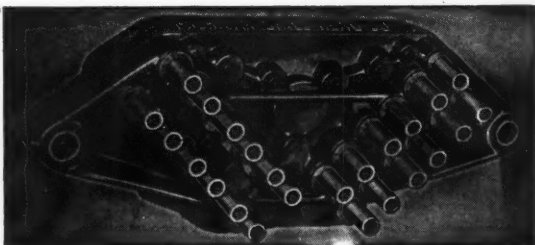
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**Johnson Bronze Catalog No. 460.** Comprising 80 pages containing interesting, informative sleeve bearing data, a catalog designated as the No. 460 is announced by the Johnson Bronze Co., 500 S. Mill St., New Castle, Pa. The catalog lists, describes, and illustrates a complete stock bronze bearing service which includes bushings, bearings, bar bronze, and babbitt. Copy free to executives.

**G.E. Insulating Varnishes.** A 40-page booklet containing complete technical and application data on insulating varnishes has been issued by the Resin and Insulation Materials Division, Chemical Department, General Electric Co., Pittsfield, Mass. The booklet covers specifications, electrical properties, film properties, cure and aging, chemical properties, and baking and air drying cycles of each type of insulating varnish. Types consist of black baking, black air drying, clear baking, clear air drying, black baking and air drying, clear baking and air drying, sticking varnishes, and air drying and baking enamels. Thirty-six grades are described. Copy of Booklet CDR is available free of charge to interested executives addressing requests on company letterheads.

**Blackhawk Hydraulic Jacks.** A line of hydraulic jacks up to 100-ton capacity, as well as gage-equipped jacks and wheeled floor jacks, is illustrated and described in a 12-page catalog published by the Blackhawk Manufacturing Co., Catalog Dept., Milwaukee 1, Wis. In addition to providing complete specifications, the catalog suggests unusual applications and uses of the different types of jacks covered. A price schedule is also included with the catalog, copy of which is available free by requesting Catalog No. J-46.

**"'Caterpillar' Diesels at Work in Industry,"** a 20-page color booklet covering the use of Diesel-powered tractors in a variety of jobs requiring mobile, flexible power, has been published by the Caterpillar Tractor Co., Peoria 8, Ill. The booklet contains numerous action photographs to illustrate the text, and the pictures and text are combined to suggest many possible ways for the reader to make use of Diesel power to increase production and lower operating expenses. Copy of the booklet is available free by requesting Form 9778.

**Gairing Standard Tools.** A catalog illustrating and describing its complete line of standard tools is announced by The Gairing Tool Co., P. O. Box 478, Roosevelt Park Annex, Detroit 32, Mich. Covered are interchangeable counterbores, threaded holders, full floating holders, tungsten carbide-tipped counterbores, back spotfacers, core drills, micro-nuts, and hollow mills. A few pages are devoted to an introduction of the block-type boring tools and some of the more generally used special tools, such as multi-diameter cutters, carbide-tipped cutters, and milling cutters. Copy free.

**Hamilton Drilling and Tapping Equipment.** The Hamilton Tool Co., 828 S. 9th St., Hamilton, Ohio, has prepared a series of four colorful bulletins illustrating and describing equipment for the production tapping and drilling of small holes. Bulletin T-47 presents complete specifications and installation views of the Hamilton Super Sensitive Tapping Machine. Bulletins AM-47, MJ-47, and V-47 contain complete specifications and installation views of the Hamilton "A-M" Super Sensitive Drilling Machine, Hamilton Maxi-Jr. and Maximus Super Sensitive Drilling Machines, and Hamilton Varimatic Super Sensitive Variable Speed Drilling Machine respectively. Copy of either or all bulletins is available free upon request.

**Miniature Ball Bearings.** A four-page bulletin on miniature ball bearings for precision instruments and mechanisms is announced by Miniature Precision Bearings, Inc., Keene, N. H. The bulletin describes in detail five series of bearings—radial, super-light radial, pivot, angular contact, and thrust. Complete specifications are given, including load ratings recommended for average typical requirements. Copy free upon request.

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**"A Bull's-Eye in Hard-Facing Methods"** is the title of a four-page folder issued by the Wall Colmonoy Corp., 7th Fl., Fisher Bldg., Detroit 2, Mich., which fully illustrates and describes the Colmonoy Spray Welder developed for use with powdered Colmonoy hard-facing alloys in conjunction with the Colmonoy Sprayweld process. Copy free.

**"Cutting Tool Materials,"** a 36-page booklet which is said to analyze impartially the comparative fields of usefulness of high speed steel, cast alloys, and carbides as cutting tools, has been announced by the Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh, Pa. The booklet is designed to correlate comprehensively the basic characteristics, properties, and functions of the three broad types of cutting materials in order that their usefulness for specific requirements can be evaluated. Copy free to mechanical executives upon request.

The Rams-Head Wheel, a general-purpose wheel for rough and finish cutting to precision tolerances, is described in a four-page illustrated folder released by

The Rams-Head Co., Franklin, N. J. As indicated in the folder, the wheel is made in two colors—green for general grinding and blue for form grinding. Copy of folder free upon request.

**"Modern Metal Marking Methods"** is the title of a 32-page catalog published by The Noble & Westbrook Manufacturing Co., Westbrook St., East Hartford 8, Conn., which is designed to serve not only as a catalog of marking devices but as a guide to engineers, designers, and officials concerned with the production of products made of metal. It covers rapid production marking machines and other equipment for marking, graduating, embossing, and numbering. Included is a handy general classification index on the inside cover, as well as a complete alphabetical index on the inside back cover.

An additional feature of the catalog is a section describing the Noblewest commercial marking department which is set up to perform all types of marking operations where a limited number of pieces are involved and the cost of purchasing complete equipment would be prohibitive. Copy of Catalog No. 47 free.

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**JUNIOR MILLS** High Speed—Carbide

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Practical for use on small grinders for finishing Patterns, Dies, Parts, etc., in places difficult to reach with the larger Mills.

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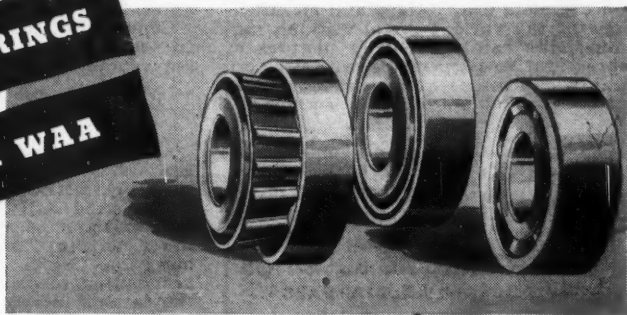
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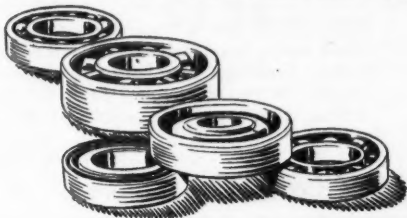


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"Di-Acro" Catalog No. 46-11. A 40-page catalog containing complete information on its redesigned "Di-Acro" Brakes, as well as "Di-Acro" Benders, Shears, and Radius Brakes, for die-less duplicating is announced by the O'Neil-Irwin Manufacturing Co., 306 Eighth Ave., Lake City, Minn. In addition to illustrations and complete descriptions and specifications of the various metal-working machines, the catalog includes pictures of representative parts made with Di-Acro Brakes and discusses the die-less duplicating possibilities of this equipment.

Representative users of Di-Acro precision machines are listed and examples of die-less duplicating are set forth. Questions and answers concerning Di-Acro equipment are provided on the last page of the catalog, which also includes a quotation sheet relative to engineering service, ordering suggestions, and guarantee.

Copy of Catalog No. 46-11 is available free to mechanical executives addressing requests on their company letterheads.



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**ACP Chemicals, Coatings, and Inhibitors.** An eight-page catalog listing in handy reference form some of the more widely used ACP metal-working chemicals and processes has been prepared by the American Chemical Paint Co., Ambler, Pa. Useful in selecting materials best suited to production requirements, the catalog includes a description of inhibitors, rustproofing processes, metal cleaning chemicals, protective coatings, and specialized products essential in fostering and maintaining conditions requisite to a successful finish. Copy is available free by requesting Technical Service Data Sheet No. P-100-21.



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**Blackhawk "Porto-Power" Hydraulic Equipment.** A 24-page profusely illustrated catalog describing portable hydraulic power tools for maintenance and production work is announced by the Blackhawk Manufacturing Co., Catalog Dept., Milwaukee 1, Wis. The catalog covers hydraulic units in 2, 4, 7, 10, 20, and 50-ton sizes, together with attachments for pushing, pulling, pressing, clamping, bending, and lifting operations. Included are pipe benders as well as large equipment which adapts hydraulic power to laboratory uses. Copy of Catalog No. P-46 free upon request.

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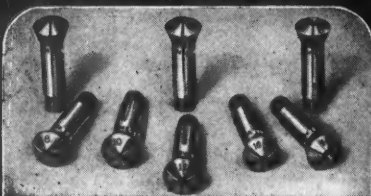


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**Clinton Hydraulic Duplicators**, designed for use with all sizes of boring mills, milling machines, lathes, planers, grinders, and special machines, are featured in a four-page folder published by the Clinton Machine Tool Co., Inc., Clinton at Sixth St., Clinton, Ind. The folder includes several illustrations showing tracer controlled machining applications of the duplicators, which are available in 1, 2, and 3-dimension types and are said to afford an accuracy within 0.002 to 0.003 inch. Copy free upon request.

**Crucible Warehouse Stock Book**. Published by the Crucible Steel Company of America, Dept. L-5, 405 Lexington Ave., New York 17, N. Y., this book lists the full range of steels available from the company's nationwide warehouse network and contains working instructions, tables, and other material helpful in specifying, heat treating, and using these steels. Copy is available free to executives addressing requests on their company letterheads.

**Cleveland High Speed Tool Catalog No. 45**. Publication of a 290-page clothbound pocket-size catalog presenting illustrated, descriptive, and tabular information on its complete line of high speed tools is announced by The Cleveland Twist Drill Co., Cleveland, Ohio. Conveniently indexed according to products by means of marginal tabs, the catalog incorporates data on twist drills, drill sets, sockets, countersinks, counterbores, reamers, carbide-tipped tools, end and hollow mills, and miscellaneous tools, as well as mechanical data, a private code, and alphabetical and numerical index.

Copy of Catalog No. 45 is available free to mechanical executives addressing requests on their company letterheads.



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3/16"	12	9	1.50	25/64"	12	9	2.75
13/64"	12	9	1.60	13/32"	12	9	2.75
7/32"	12	9	1.60	27/64"	12	9	3.00
15/64"	12	9	1.75	7/16"	12	9	3.00
1/4"	12	9	1.75	29/64"	12	9	3.25
17/64"	12	9	1.85	15/32"	12	9	3.25
9/32"	12	9	1.85	31/64"	12	9	3.25
19/64"	12	9	2.00	1/2"	12	9	3.25
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9/16"	15	12	7.00	7/8"	15	12	12.00
19/32"	15	12	7.50	29/32"	15	12	12.50
3/4"	15	12	8.00	15/16"	15	12	13.00
21/32"	15	12	8.00	31/32"	15	12	14.00
11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
3/4"	15	12	8.50	1-1/8"	20	15	18.00
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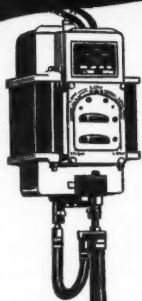
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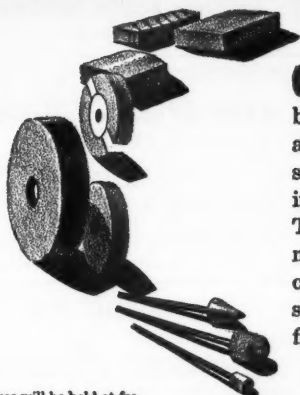
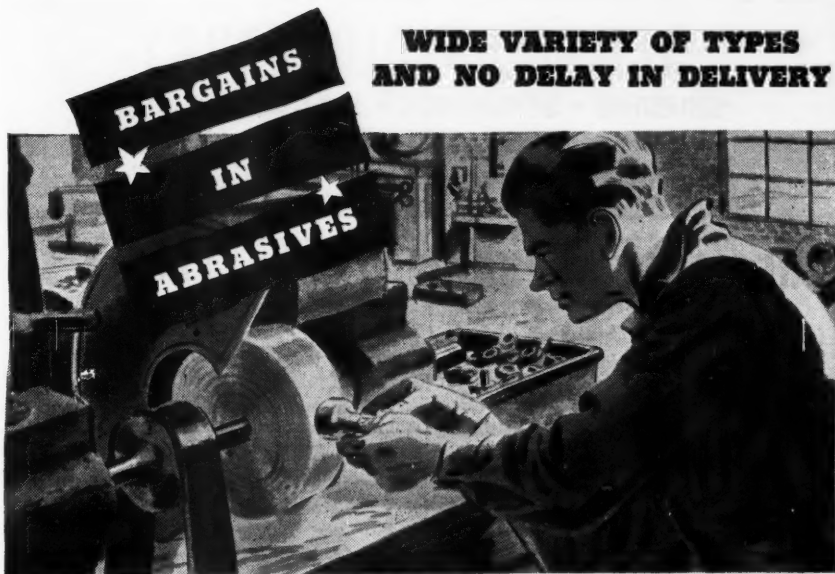
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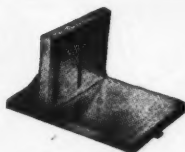
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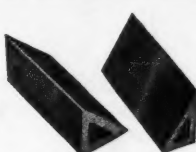
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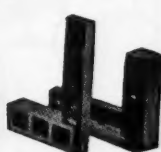
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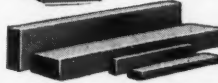
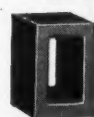
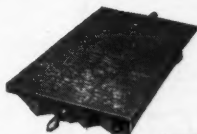
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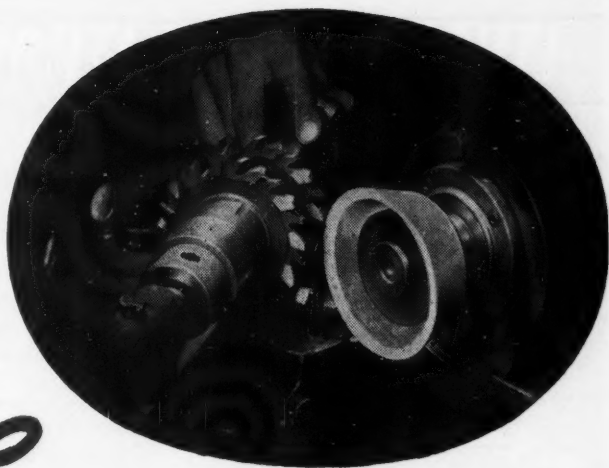




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## Over the Editor's Desk

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### The Industrial South is Growing

**A**S a gesture of recognition to the fast-increasing development of the industrial South, last month the American Society of Tool Engineers held its 1947 annual meeting in Houston, Texas. And the gesture was well justified.

The early American settlers established a vocational pattern which, largely due to the fact that industry attracts industry, was followed until the turn of the century. The North became industrialized; the South became largely agricultural. In more recent years the cotton manufacturers moved their mills to the South in order to be near the source of supply, and these industries have, in turn, attracted others.

The discovery of iron and coal in Alabama contributed immeasurably to the possibilities for metal manufacturing, and the mild Southern climate offered advantages for all-year-round shipbuilding operations. An abundance of oil, sulphur, and other chemicals has helped. Manufacturing establishments are developing in the South at an ever-increasing rate.

Construction in the Southern states is increasing rapidly; in the first two months of 1947 contracts for construction in the South mounted to a value of \$260,675,000—an increase of 8 per cent over the same period of last year.

Mississippi is moving ahead; whereas Mississippi has always been considered an agricultural state, in 1946 non-agricultural jobs amounted to 49.3 per cent of

the total of employment. Industrial wages in 1946 totaled \$237,000,000 as against \$94,400,000 in 1939. The increase in effective buying power was 237 per cent.

Tennessee profited by a production increase of approximately 80 per cent in 1946 over 1939. Of the 22 plants built in Tennessee for war purposes, 14 have been transferred to private industry.

Two large plants for the manufacture of farming machinery are now under construction in the South, one at Louisville and one at Memphis. Texas promises to become the world's largest center for the chemical industry, due to its great alkali and chlorine deposits, and to the abundant quantities of such raw materials as natural gas, petroleum, salt, lime and sulphur. Natural gas at 10¢ per m.c.f. is roughly equivalent on a B.t.u. basis to coal at \$3 per ton. The Union Carbide and Carbon Corporation is spending \$50,000,000 on an addition to its plant on the Texas gulf coast, and industrial expansion in Corpus Christi will amount to \$30,000,000 in 1947.

The industrialization of North Carolina is picking up sharply; in 1946 the state acquired 631 industrial plants and 210 existing plants expanded their facilities.

Every industry that is added to the region South of the Ohio River aids in raising the buying power and living standards of that section of our country—and what is good for the South is good for America as a whole.

*Howard Campbell*

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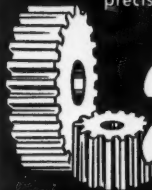
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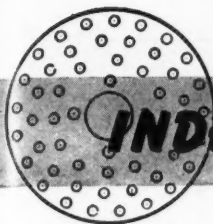
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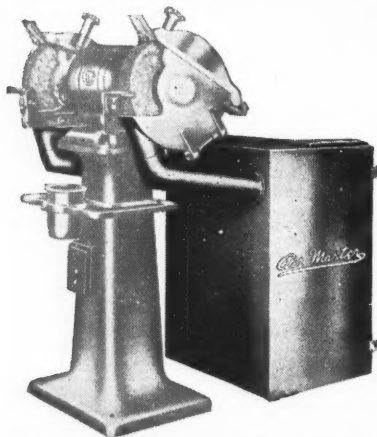
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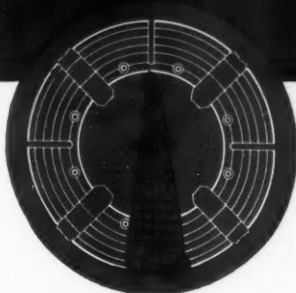
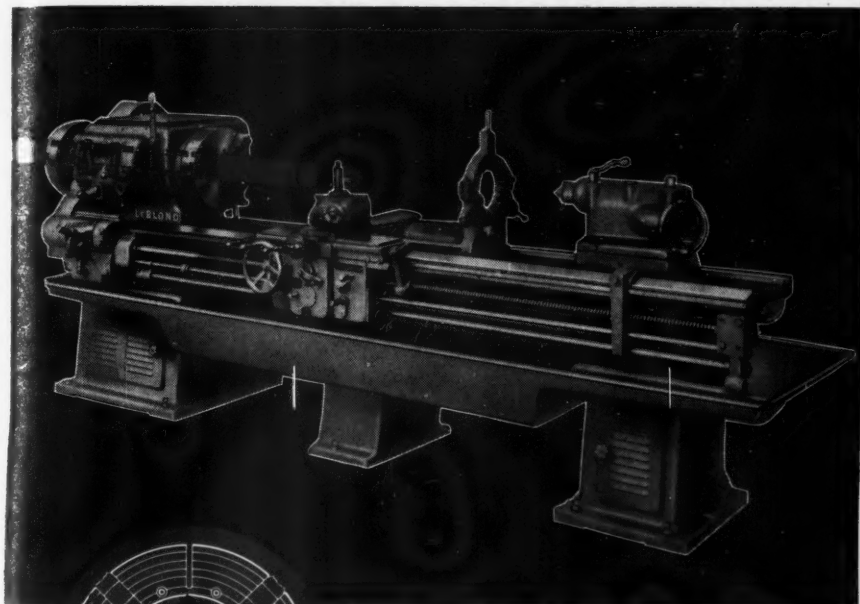
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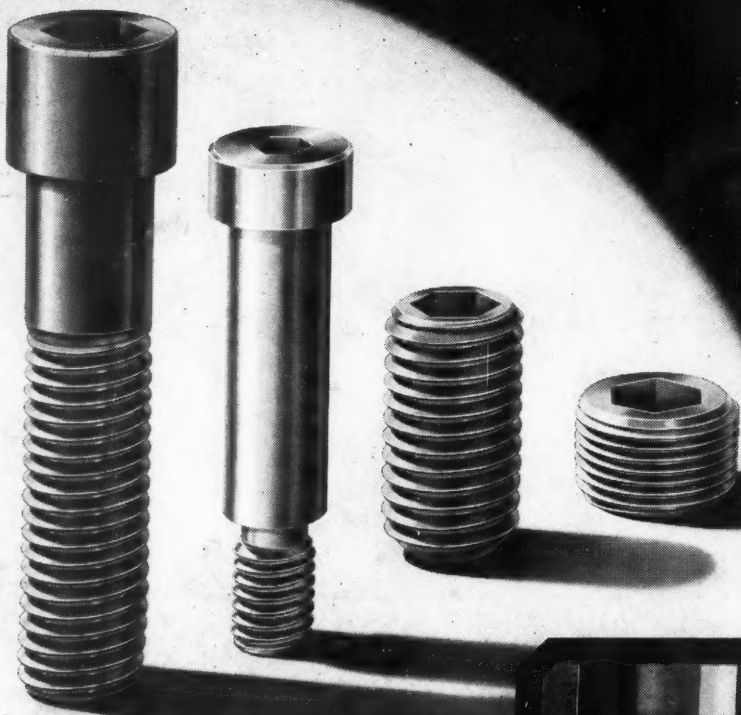
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